Release in Full

History EPU #6

T 15 P

'63 – 98

THE MURPHY CORPORATION

East Poplar Unit #6

Roosevelt County, Montana

C. H. MURPHY, JR., ET AL

EAST POPLAR UNIT #6

C NE SE SEC. 10, TWP 28N, RGE 51E
ROOSEVELT COUNTY, MONTANA

ELEVATION 2101' K. B.

HISTORY

ELECTRO LOG DATA

CORE DESCRIPTIONS

CORE ANALYSIS

DRILL STEM TESTS

WATER ANALYSIS

COMPLETION DATA

PRODUCTION TEST DATA

SAMPLE DESCRIPTION

C. H. MURPHY JR., ET AL

EAST POPLAR UNIT #5

LOCATION: C NE NE Section 10, Township 28 North, Range 51 East, Roosevelt County, Montana

ELEVATION: 2101' K. B.

SPUDDED: July 12, 1952

TOTAL DEPTH: 5785 Drlr. 5788 Schlumberger

HISTORY

July 12 Spudded. Drilled to 46' with 17½" bit. Set 30' of 13 3/8" 48# H-40 conductor pipe 16' below RKB with 40 sacks cement & 4% $CaCl_2$.

July 13 Drilled 46'---655' with 12¼" bit.

July 14 Cut Core No. 1, 655-685, with 6 1/8" diamond bit.

July 15 Cut Core No. 2, 685'-701' with 6 1/8" diamond bit; began cutting Core No. 3 at 701' with 6 1/8" diamond bit.

July 16 Pulled Core No. 3, 701-728; cut Core No. 4, 728-748; cut Core No. 5, 748-752; cut Core No. 6, 752-790.

July 17 Ran Drill Stem Test No. 1, 769'-789'. Reamed 655-790 with 12¼" bit. Cut Core No. 7, 790-820' with 6 1/8" diamond bit.

July 18 Ran Drill Stem Test No. 2, 793'-820'. Reamed 790'-820' with 12¼" bit. Drilled 820'-980' with 12¼" bit. Ran Schlumberger ES Log.

July 19 Set 960.41' 9 5/8" 36# J-55 casing at 974.01 with 400 sacks regular cement and 2% $CaCl_2$.

July 20 Went out from under surface and drilled to 1470' with 8 3/4" bit.

July 21-31 Drilled 1470'-4880' with 8 3/4" bit.

August 1 Cut Core No. 8, 4850-4894 with 6 1/8" diamond bit; began cutting Core No. 9 with 6 1/8" diamond bit.

August 2 Pulled Core No. 9, 4894-4971' Ran Drill Stem Test No. 3, 4895-49[illegible].

August 8 9 Reamed 4850-4971' and drilled 4971'-5464 with 8 3/4" bit.

August 9 10 Cut Core No. 10, 5464-5483, cut Core No. 11, 5483-5515 with 7 7/8" diamond bit.

August 11 Ran Drill Stem Test No. 4, 5489'-5512'. Drilled 5512-5553 with 7 7/8" bit.

August 12 Drilled 5553-5599; began cutting Core No. 12 with 7 7/8" diamond bit.

August 13 Pulled Core No. 12, 5599-5634. Ran Drill Stem Test No. 5, 5604'-5634'. Drilled 5634'-5639' with 7 7/8" bit.

August 14 Drilled 5639'-5728.

August 15 Drilled 5728'-5750. Began cutting Core No. 13 with 7 7/8" diamond bit.

August 16 Pulled Core No. 13, 5750'-5775'. Cut Core No. 14, 5775'-5786'. Ran Drill Stem Test No. 6, 5771-86.

August 17 Ran Schlumberger ES and Microlog. (5786 Drlr. = 5788 Schlumberger) Ran casing; set 5763.57' of 5½" at 5776 with 250 sacks regular cement.

August 18-19 Waiting on Cement.

August 20-22 Well completed as set forth under "Completion Data."

SUPPLEMENT TO EPU #6

4-29-64 TD 5788' - Mixed mud wt. to 10.2#. Killed well with Halliburton pump truck. Rigged up pulling unit and attempted to break Baker tubing anchor after pumping cold fluid in hole. Anchor would not break. Pulled rods out of hole. Ran Bomco free point indicator and string shot, found tubing free to top of Baker Crossover sub. Attempted to back off one joint above Baker Isolation Packer, string shot fail to fire. Rods second run with string shot backed 2-7/8" tbg. off at 4460' one joint above packer. Started out of hole with tubing. Closed well in overnight.

4-30-64 TD 5788' - Well pressured up overnight. Mixed mud and killed well Finished pulling tubing out of hole. Ran Bomco bumper jars, oil jars, and 6 3-1/2" O.D. drill collars. Picked up 2-7/8" N-80 workover string of tbg.. Screwed into fish at 4460', jarred Baker Isolation Pkr. and tbg. anchor free. Pulled out of hole laying down W.O. tbg. and packer. Closed well in overnight.

5-01-64 TD 5788' - Finished pulling tbg. out of hole. Ran new Baker seal for Model B.C. Packer Reversed mud out of hole with salt water. Stung in and flowed through B.C. Packer to clear pkr. of mud. Spaced tbg. 30' above B.C. Packer set at 5748 . Ran rods and 2½" x 2" x 16' insert pump. Started well pumping at 3:00 PM 5-01-64. The C Zone is shut in with BC Packer. Pumping the B-1 & 2 Zone only. TO DROP FROM REPORT.

5-15-64 Rods Pulled Tubing stung into BC Packer Flowing C-3 Zone

EAST POPLAR UNIT NO. 6
SUPPLEMENT TO WELL HISTORY

7-6-99	Move in and rig up pulling unit. Also move in test tanks and mud pump. Mix 60 barrels mud to 10.3#, kill tubing, take 2" valve off tubing and install 2-7/8" valve. Shut down for Wireline truck.
7-7-99	Rig up Penkota Wireline, log tubing to find seating nipple and isolation packer. Did not find a seating nipple or isolation packer on strip log. Could not get below 5720', perforated 2 holes at 5500'. Rig down wireline, mix mud to 10.3# to kill casing. Work tubing, could not get tubing loose, shut down.
7-8-99	Change out wellhead, circulate mud out of hole. Swab well to get it to flow. Shut down-to windy to rig down.
7-9-99	Rig down and move off.

Contingency Plans For An Oil Discharge

East Poplar Unit D Battery and Wells EPU Nos. 6, 9, 11, & 15

The field is visited twice daily by the pumper. Visual inspection is made on each facility on each visit to determine if any malfunction is occuring. The most likely potential oil discharges are checked thoroughly. Periodically, the field foreman, Mr. Gerald Hagadone, will conduct a close check of the entire facility.

The pumpers, Mr. Ferdinand Charette and Mr. Robert Atkinson, have been instructed in the operations and maintenance of equipment to prevent oil and water discharges and informed of the applicable pollution control laws, rules and regulations. If an oil discharge occurs, thepumper will immediately close the proper valves and/or shut down the production facility to stop the discharge. He will then call Mr. Gerald Hagadone who will in turn inform Mr. Bill Brown, District Superintendent. If needed, the proper state and federal agencies will be notified by Mr. Brown. The discharged oil will be reclaimed or disposed of by approved engineering procedures and in accordance to law.

In the event discharged oil collects on standing water such as a stock pond or rain water standing in a low spot, the oil will be pumped into a tank truck. The skim of oil left on the water will be removed by an oil skimmer owned by Murphy Oil Corporation. The skimmer can be towed to the field within an hours time.

If the discharge is in excess of 50 barrels of oil, the Montana Department of Health and Environmental Sciences in Helena will be notified by Mr. Brown.

If a Spill Event occurs as defined by federal law, the Environmental Protection Agency in Denver, Colorado will be notified by Mr. Brown.

Telephone numbers and personnel to be notified in case of an oil discharge are as follows:

Phone Numbers as listed on other copies will be included on final copy.

SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN

East Poplar Unit D Battery and Wells EPU Nos. 6, 9, 11, & 15

The East Poplar Unit D Battery and the wells producing into the battery, EPU 6, 9, 11, & 15, are onshore production facilities located in Roosevelt County, Montana, in the East Poplar Unit Oil Field. The battery consists of a 6' x 27' vertical separator, a circulating pump with appropriate lines, and two 1,000 barrel galvanized bolted tanks. An earthen pit of about 8,000 barrel capacity is located at the tank battery into which the separator or tanks may be emptied if needed for fluid storage.

The field is about 6 miles Northeast of Poplar, Montana, in Townships 28 and 29 North and Ranges 50 and 51 East.

The operator of the East Poplar Unit D Lease is Murphy Oil Corporation located at P.O. Box 547, Poplar, Montana 59255. The corporation headquarters are at 200 Jefferson Avenue, El Dorado, Arkansas 71730.

The foreman, Mr. Gerald Hagadone, is responsible for oil spill prevention at this facility. On each trip to thelease the pumper makes a visual inspection of all facilities and reports any malfunction to the foreman, Mr. Gerald Hagadone, and notes this malfunction on the ten day gauge report. There has been no reportable oil Spill Event during the twelve months prior to January 10, 1974.

The equipment is in excellent operating condition and there is no reasonable likelihood of a discharge or spill event.

The field flow lines and well casing of each well are cathodically protected.

Personnel are properly instructed in the operation and maintenance of equipment to prevent oil discharges, and applicable pollution control laws, rules and regulations. Each employee is given these instructions by the field foreman when they are employed. Scheduled prevention briefings for the operating personnel are conducted frequently enough to assure adequate understanding of the SPCC Plan. The procedures are reviewed every six months by the field foreman with each employee. When changes occur in procedures, each employee is informed.

Fluid in the 8,000 barrel storage pit is pumped to the salt water disposal unit if the water is brackish as determined by chloride tests. If only fresh water is contained in the pit it is disposed of by placing on lease roads to control dust and compact the roads. Any oil in the pit is pumped back through the separator with the water being sent to the disposal well. Oil skims are burned by state permits. There are no outlets from the storage pit and all fluids must be pumped out.

The two 1,000 barrel tanks are galvanized and are bolted construction. The tanks are vented to the atmosphere and have unrestricted 4" overflow lines between tanks.

The EPU No. 6 is a flowing well. The EPU Nos. 9, 11, & 15 are pumped with a rod pump. There are 4' x 4' x 2' cellars at each of the pumping wellheads with overflow lines to earthen pits capable of holding a full days production in case of a leak at the well site.

The facilities are about 2.2 miles from the Poplar River. The terrain dips gently West. The soil is sandy and the fields are under cultivation. Because of the

distance to the river, the type of soil, and the terrain the 8,000 barrel pit at the tank battery and the well cellars and overflow pits are sufficient seconday containment for these facilities.

The tanks are observed daily by the pumper. Periodically, the foreman checks the entire tank battery and producing wells closely. If any trouble is suspected, the facility is shut down, the tanks and/or separator are emptied and cleaned. The facility is then thoroughly inspected by service company personnel, repairs are made if needed and the unit is placed back into service.

Produced salt water is pumped to a field gathering system for injection into a salt water disposal well. The above ground facilities are observed daily by the pumper and inspected by the foreman closely on his visits to the lease.

All salt water disposal flowlines are cement asbestos lines. These lines are buried and the surface is observed daily by the pumper.

MANAGEMENT APPROVAL

This SPCC Plan will be implemented as herein described.

Signature _____

Name _____

Title _____

CERTIFICATION

I hereby certify that I have examined the facility, and being familiar with the provisions of 40 CFR, Part 112, attest that this SPCC Plan has been prepared in accordance with good engineering practices.

_____
Printed Name Of Registered Professional Engineer

(Seal)

_____
Signature Of Registered Professional Engineer

Date _____

Registration No. _____ State _____

AUTHORITY FOR EXPENDITURE

MURPHY CORPORATION - E.POPLAR NO. 6

NE of SE of Sec. 10, Twp. 28N., Range 51E., Roosevelt Co., Montana

WELL DRILLING & CONSTRUCTION EXPENSE:	TO CSG.PT.	COMP. & EQUIP.	TOTAL COST
Drilling: Rig up & rig down	$ 3,000	$	$ 3,000
Day Work - 53 days @ $850/day (6000')	39,100	5,950	45,050
Loc. survey, permit & prep.	1,000		1,000
Roads, fences, cattleguards, etc.		400	400
Mud mat. & chem.,incl. oil & gas	6,000		6,000
Fuel	5,625	625	6,250
Water	540	60	600
Drilling bits, baskets, etc.	3,960	210	4,170
Drill pipe rental	4,000		4,000
Move rig in & out	4,000		4,000
Cementing casing	1,050	800	1,850
Coring materials & services	3,450		3,450
Testing services, incl. swabbing	2,950	610	3,560
Core Analysis	1,500		1,500
Other logs, surveys & analyses	1,010	540	1,550
Perf. & set packer		1,750	1,750
Float equip., centralizers, etc.	110	340	450
Trucking, welding & other labor	700	1,000	1,700
Supervision & miscellaneous	4,105	115	4,220
Total Estimated Well Drilling & Const.Exp.	$ 82,100	$12,400	$ 94,500
WELL EQUIPMENT COSTS:			
Casing: 1000' of 9-5/8" O.D. 36# J-55	$ 3,180	$	$ 3,180
Casing: 6000' of 5-1/2" O.D. 15.50# J-55		8,160	8,160
Tubing: 6000' of 2-3/8" 4.70# J-55		3,060	3,060
Packers, etc.		570	570
Casing head & connections	600	250	850
Xmas Tree & connections		1,800	1,800
Miscellaneous		880	880
Total Estimated Well Equip. Costs	3,780	14,720	18,500
Total Estimated Cost of Well	$ 85,880	$27,120	$113,000
LEASE EQUIPMENT:			
Flow lines - 2" LP (2200')		700	700
Other line pipe, valves & fittings		250	250
Trucking, welding & other labor		250	250
Total Estimated Cost of Lease Equip.		1,200	1,200
TOTAL EST. COST OF WELL & LEASE EQUIP.	$ 85,880	$28,320	$114,200

APPORTIONMENT OF TOTAL ESTIMATED COSTS

APPROVAL OF EXPENDITURE

Production Department

Requested by /s/ Paul McDonald

Date 6-20-52

Approved by /s/ R. A. Custis V.P.

Date 6-20-52

Executive Department

Approved by /s/ Christopher Kelly Jr Pres.

Date 6-20-52

Aporoved _____

By _____

Date _____

AKM-lc
6-20-52

A.F.E. #57-4-6

AUTHORITY FOR EXPENDITURE
MURPHY CORPORATION - EAST POPLAR UNIT NO. 6
NE SE Section 10-T28N-R61E, Roosevelt County, Montana
(Installation of Pumping Unit)

Pumping unit complete with engine	$5,650
Labor and materials setting unit	750
Trucking, small fittings and incidentals	150
Rods, pump, and well head equipment	3,000
TOTAL ESTIMATED COST	$9,550

APPORTIONMENT OF TOTAL ESTIMATED COST

	%	
Murphy Corporation - Unit Operator	31.448470	$3,003
Munoco Company	2.096565	200
Placid Oil Company	33.545035	3,203
The Carter Oil Company	16.336860	1,560
Phillips Petroleum Company	16.336860	1,560
C. F. Lundgren	.238210	23

APPROVAL OF EXPENDITURE

Requested by:

Harold Miles — JUN 8 1956
Division Production Supt. — Date

Recommend Approval:

Staff Production Man — Date

Recommend Approval:

Asst Division Manager — JUN 8 1956
Date

Budget Supervisor — Date

Approved:

By — Date

Approved:

Vice President-Operations — Date

HM:eg
6-8-56

File #6

..F.E. NO. 3-1520

AUTHORITY FOR EXPENDITURE
MURPHY CORPORATION - EAST POPLAR UNIT NO. 6
C NE SE Section 10, T28N, R51E, Roosevelt County, Montana

(Dual produce the B-1, 2, & C Zones)

HISTORY: EPU #6 was completed as a dual producer August 22, 1952 in the B-1 Zone, perforations 5612-20', B-2 Zone perforations 5629-39', and the C-3 Zone open hole 5776-88'. Model "D" Production Packer set at 5758'. The B-Zones flowed through 5½" casing annulus and the C-3 Zone flowed through 2-3/8" tubing. Cumulative prod. from the C-3 Zone through June 1963, 221,219 barrels oil, 471,005 barrels water. The C-3 Zone was shut in December 1956 to November 1959 to pump the B-Zones). The B-Zones were shut in November 1959 to flow the C-3 Zone. Last test B-1 & 2 Zones, November 2, 1959, pumping at the rate of 292 BFPD, 70% water, 88 BOPD, 205 BWPD. Cumulative production from the B-Zones through November 1959 - 294,795 barrels oil, 243,061 barrels water.

PRESENT STATUS: Flowing from the C-3 Zone on a P-36 choke at the rate of 363 BFPD, 89% water, 40 BOPD, 323 BWPD, TFP-500 PSI. The B-Zones shut in with Otis Side Door Choke.

JUSTIFICATION: To increase production and attempt to deplete both B & C Zones within the casing life of the well. Expected production from the B-Zones - 30-40 BOPD and 270-280 BWPD.

PROPOSAL: Kill C-Zone with mud (Back pressure valve in Model "D" Production Packer will not hold). Run and set Baker Model "BC" multiple acting cement retainer on wire line at 5750' with dual cross over equipment. To pump the B-1 & 2 Zones co-mingled through 2-7/8" tubing. Flow the C Zone through 5½" casing annulus. The Model "BC" retainer will shut in the C Zone flow when seal assembly is pulled out of retainer to make trip with tubing for B-Zone well service.

(To change out 2600' of 2-3/8" tubing to 2-7/8" tubing).

ESTIMATED COST

Pulling unit 40 hours at $30 per hour	$ 1,200
Dia-Log 3161' of 2-7/8" tubing, haul mud and kill well	$ 1,000
2600' of 2-7/8" Class #1 tubing, rods and pump	$ 5,725
Dual cross over equipment and setting retainer on wire line	$ 2,000
Misc. labor, trucking and material	$ 775
TOTAL ESTIMATED COST	$10,700

APPORTIONMENT OF TOTAL ESTIMATED COST

Murphy Corporation	31.448470%	$ 3,365
Mumco Company	2.096565%	$ 224
Placid Oil Company	33.545035%	$ 3,589
Humble Oil & Refining Company	16.335860%	$ 1,748
Phillips Petroleum Company	16.335860%	$ 1,748
C. F. Lundgren	.238210%	$ 26

APPROVAL OF EXPENDITURE

Requested By: M. T. James 9-16-63
H. T. James Date

Recommend Approval:

L. L. Duncan Date

W. J. Thornton Date

APPROVED:

K. J. Seberry 10-9-63
Manager - P. & E. Date

MTJ/bab
9-16-63

OK to go ahead as per L L Duncan
still lack Humble approval
10-2

M T James Approved

File

A.F.E. NO. 4-1518

AUTHORITY FOR EXPENDITURE
MURPHY OIL CORPORATION - EAST POPLAR UNIT NO. 6
C NE SE Section 10, T28N, R51E, Roosevelt County, Montana

Emergency A.F.E. #4-1518 is to cover the estimated cost of recovering dual equipment with stuck tubing anchor.

The cups on the dual cross over packer had three failures. The tubing anchor would not release on the third packer failure and required muding up to kill the C-Zone flow, backing off tubing and running jars to release tubing anchor.

ESTIMATED COST

Pulling unit	$1,025
Back off tbg. and tool to jar loose	$1,225
Mud material and pump truck to kill C-Zone flow	$1,075
Misc. labor, trucking and material	$ 650
TOTAL ESTIMATED COST	$3,975

APPORTIONMENT OF TOTAL ESTIMATED COST

Murphy Oil Corporation	31.443470%	$1,250
Manoco Company	2.096565%	$ 83
Placid Oil Company	33.545035%	$1,333
Humble Oil & Refining Company	16.335860%	$ 650
Phillips Petroleum Company	16.335860%	$ 650
C. F. Lundgren	.238210%	$ 9

APPROVAL OF EXPENDITURE

Requested By:

M. T. James — 5-4-64 Date

APPROVED:

L. L. Duncan — 5-7-64 Date

W. J. Thornton — 5/13/64 Date

MTJ/bab
May 4, 1964

A.F.E. No. 6-1519-10

AUTHORITY FOR EXPENDITURE
MURPHY OIL CORPORATION - EAST POPLAR UNIT NO. 6
C NE SE Section 10, T28N, R51E, Roosevelt County, Montana

Capital

Proposal and Justification: Propose to replace 800' of 2" steel flowline from well No. 6 to treater.

We have experienced numerous leaks in this line and since the well is flowing over 2,000 barrels fluid per day, it should be changed out.

ESTIMATED COST

800' of Cond. 3 2-7/8" Tubing	$ 1,000
Labor and Ditcher	$ 1,800
Supervision	$ 100
Total Estimated Cost	$ 2,900

APPORTIONMENT OF TOTAL ESTIMATED COST

Murphy Oil Corporation	31.448470%	$ 912
Placid Oil Company	33.545035%	$ 973
Phillips Petroleum Company	16.335860%	$ 474
Exxon Company, U.S.A.	16.335860%	$ 474
Munoco Company	2.096565%	$ 61
C. F. Lundgren	.238210%	$ 6

APPROVAL OF EXPENDITURE

Requested by:

Billy G. Melear — Date: 5-7-76

Approved by:

A. W. Simpson — Date: 5/10/76

BGM/sb
May 7, 1976

EPU #6

A.F.E. No. 80604
OBJECT CODE: 232910

MURPHY EXPLORATION AND PRODUCTION COMPANY
AUTHORITY FOR EXPENDITURE
EAST POPLAR UNIT NO. 6
C NE SE Section 10, T28N, R51E
ROOSEVELT COUNTY, MONTANA

PROPOSAL AND JUSTIFICATION:

This well has had 2 flowline leaks this past winter.

It is proposed to replace this line with 2" A.O. Smith Red Thread fiberglass pipe.

ESTIMATED COSTS

900' 2" Fiberglass Pipe	$ 2,160
Trenching and Installing Line	2,025
Connections	500
Supervision and Miscellaneous	315
Total Estimated Cost	$ 5,000

APPORTIONMENT OF TOTAL ESTIMATED COST

MURPHY EXPRO	76.937788%	$ 3,847
DOIL OIL & GAS	20.965647%	1,048
MUNOCO COMPANY	2.096565%	105

APPROVAL OF EXPENDITURE

Requested By:

R.R. MAR 25,98
Ray Reede Date

Approved By:

MAR 25,98
Date

3/25/98
Date

Permit App. EPA #6

6 pages

'63-4

PERMIT APPLICATIONS

68

Form No. 2
GENERAL RULES
201, 202, 213,
216, 219, 233.1

F:10

(SUBMIT IN QUADRUPLICATE)
TO
OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA
BILLINGS OR SHELBY

NOTICE!
THIS FORM BECOMES A PERMIT WHEN STAMPED APPROVED BY AN AGENT OF THE COMMISSION.

SUNDRY NOTICES AND REPORT OF WELLS

Notice of Intention to Drill		Subsequent Report of Water Shut-off	
Notice of Intention to Change Plans		Subsequent Report of Shooting, Acidizing, Cementing	
Notice of Intention to Test Water Shut-off		Subsequent Report of Altering Casing	
Notice of Intention to Redrill or Repair Well		Subsequent Report of Redrilling or Repair	
Notice of Intention to Shoot, Acidize, or Cement		Subsequent Report of Abandonment	
Notice of Intention to Pull or Alter Casing		Supplementary Well History	
Notice of Intention to Abandon Well		Report of Fracturing	
Notice of Intention of Workover	X		

(Indicate Above by Check Mark Nature of Report, Notice, or Other Data)

December 10, 1963

Following is a {notice of intention to do work} on land {leased} described as follows:

LEASE Reynolds

MONTANA (State) Roosevelt (County) East Poplar (Field)

Well No. 6 NE/4 SE/4 Section 10 T28N R51E MPM
(m. sec.) (Township) (Range) (Meridian)

The well is located 1980 ft. from {N/S} line and 660 ft. from {E/W} line of Sec. 10

(Locate accurately on Plat on back of this form the well location, and show lease boundary.)

The elevation of the derrick floor above the sea level is 2101 DKB

RECEIVED
DEC 10 1963
OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA • BILLINGS

READ CAREFULLY — DETAILS OF PLAN OF WORK — READ CAREFULLY

(State names of and expected depths to objective sands; show size, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work, particularly all details results Shooting, Acidizing, Fracturing.)

DETAILS OF WORK
RESULT

To increase production and attempt to deplete both the B & C Zones within the casing life of the well. Expected production from the B-Zones - 30-40 BOPD and 270-280 BWPD.

Kill C-Zone with mud (Back pressure valve in Model "D" Production Packer will not hold). Run and set Baker Model "EC" multiple acting cement retainer on wire line at 5750' with dual cross over equipment. To pump the B Zones commingled through 2-7/8" tubing. Flow the C Zone through 5½" casing annulus. The Model "EC" Retainer will shut in the C Zone flow when seal assembly is pulled out of retainer to make trip with tubing for B-Zone well service.

Approved subject to conditions on reverse of form

Date DEC 10 1963

By ORIGINAL SIGNED BY:
R. M. Watkins, Petr. Engr.
Title
District Office Agent

Company Murphy Corporation

By ORIGINAL SIGNED BY M. T. JAMES

Title Field Production Superintendant

Address P.O. Box 347, Poplar, Montana 59255

NOTE:—Reports on this Form to be submitted to the District Agent for Approval in Quadruplicate.

WHEN USED AS PERMIT TO DRILL, THIS EXPIRES 90 DAYS FROM DATE OF APPROVAL

OVER

Form 9-331
(May 1963)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN TRIPLICATE (Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1424.

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use "APPLICATION FOR PERMIT—" for such proposals.)

U. S. GEOLOGICAL SURVEY
RECEIVED
DEC 11 1963
[illegible], MONTANA

1. OIL WELL [X] GAS WELL [ ] OTHER

2. NAME OF OPERATOR: Murphy Corporation

3. ADDRESS OF OPERATOR: Poplar, Montana

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.) At surface: 1980' from S line and 660' from E line of Section 10

5. LEASE DESIGNATION AND SERIAL NO.: Reynolds

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

7. UNIT AGREEMENT NAME: East Poplar

8. FARM OR LEASE NAME:

9. WELL NO.: EPU #6

10. FIELD AND POOL, OR WILDCAT: East Poplar Unit

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: NE/4 SE/4 Section 10, T28N, R51E, MPM

12. COUNTY OR PARISH: Roosevelt

13. STATE: Montana

14. PERMIT NO.:

15. ELEVATIONS (Show whether DF, RT, GR, etc.): 2101 RKB

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	[ ]	PULL OR ALTER CASING	[ ]	WATER SHUT-OFF	[ ]	REPAIRING WELL	[ ]
FRACTURE TREAT	[ ]	MULTIPLE COMPLETE	[ ]	FRACTURE TREATMENT	[ ]	ALTERING CASING	[ ]
SHOOT OR ACIDIZE	[ ]	ABANDON*	[ ]	SHOOTING OR ACIDIZING	[ ]	ABANDONMENT*	[ ]
REPAIR WELL	[ ]	CHANGE PLANS	[ ]	(Other)			
(Other)		Workover	[X]				

(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

To increase production and attempt to deplete both the B & C Zones within the casing life of the well. Expected production from the B-Zones - 30-40 BOPD and 270-280 BWPD.

Kill C-Zone with mud (Back pressure valve in Model "D" Production Packer will not hold). Run and set Baker Model "BC" multiple acting cement retainer on wire line at 5750' with dual cross over equipment. To pump the B Zones commingled through 2-7/8" tubing. Flow the C Zone through 5½" casing annulus. The Model "BC" Retainer will shut in the C Zone flow when seal assembly is pulled out of retainer to make trip with tubing for B-Zone well service.

18. I hereby certify that the foregoing is true and correct

SIGNED ORIGINAL SIGNED BY M. T. JAMES TITLE Field Production Superintendent DATE December 10, 1963

(This space for Federal or State office use)

APPROVED BY (ORIG. SGD.) R. A. SMITH TITLE ACTING DISTRICT ENGINEER DATE DEC 12 1963
CONDITIONS OF APPROVAL, IF ANY:

*See Instructions on Reverse Side

Form 9-331
(May 1963)

File

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN TRIPLICATE* (Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1424.

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use "APPLICATION FOR PERMIT—" for such proposals.)

U. S. GEOLOGICAL SURVEY
RECEIVED
FEB 17 1964
BILLINGS, MONTANA

1. OIL WELL ☒ GAS WELL ☐ OTHER

2. NAME OF OPERATOR
Murphy Oil Corporation

3. ADDRESS OF OPERATOR
Poplar, Montana 59255

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.)
At surface
1980' from S line and 660' from E line of Section 10

5. LEASE DESIGNATION AND SERIAL NO.
Reynolds

6. IF INDIAN, ALLOTTEE OR TRIBE NAME

7. UNIT AGREEMENT NAME
East Poplar

8. FARM OR LEASE NAME

9. WELL NO.
RPU #6

10. FIELD AND POOL, OR WILDCAT
East Poplar Unit

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
NE/4 SE/4 Section 10 T28N R51E

12. COUNTY OR PARISH
Roosevelt

13. STATE
Montana

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.)
2101 RKB

16. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	☐	PULL OR ALTER CASING	☐	WATER SHUT-OFF	☐	REPAIRING WELL	☐
FRACTURE TREAT	☐	MULTIPLE COMPLETE	☐	FRACTURE TREATMENT	☐	ALTERING CASING	☐
SHOOT OR ACIDIZE	☐	ABANDON*	☐	SHOOTING OR ACIDIZING	☐	ABANDONMENT*	☐
REPAIR WELL	☐	CHANGE PLANS	☐	(Other)		Workover	☒
(Other)				(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

See attached workover sheet.

18. I hereby certify that the foregoing is true and correct

SIGNED ORIGINAL SIGNED BY M. T. JAMES TITLE Field Production Superintendent DATE February 14, 1964

(This space for Federal or State office use)

APPROVED BY (ORIG. SGD.) HILLARY A. ODEN TITLE DISTRICT ENGINEER DATE MAR 2 1964

CONDITIONS OF APPROVAL, IF ANY:

ORIGINAL FORWARDED TO CASPER

*See Instructions on Reverse Side

Form No. 2

GENERAL RULES
201, 202, 213,
216, 219, 233.1

File

(SUBMIT IN QUADRUPLICATE)
TO

OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA
BILLINGS OR SHELBY

NOTICE
THIS FORM BECOMES A PERMIT WHEN STAMPED APPROVED BY AN AGENT OF THE COMMISSION.

SUNDRY NOTICES AND REPORT OF WELLS

Notice of Intention to Drill		Subsequent Report of Water Shut-off	
Notice of Intention to Change Plans		Subsequent Report of Shooting, Acidizing, Cementing	
Notice of Intention to Test Water Shut-off		Subsequent Report of Altering Casing	
Notice of Intention to Redrill or Repair Well		Subsequent Report of Redrilling or Repair	
Notice of Intention to Shoot, Acidize, or Cement		Subsequent Report of Abandonment	
Notice of Intention to Pull or Alter Casing		Supplementary Well History	
Notice of Intention to Abandon Well		Report of Fracturing	
		Report of Workover	XX

(Indicate Above by Check Mark Nature of Report, Notice, or Other Data)

February 14, 1964

Following is a {report of work done} on land {leased} described as follows:

LEASE Reynolds

MONTANA (State) Roosevelt (County) East Poplar (Field)

Well No. 6 NE/4 SE/4 Section 19 (m. sec.) T28N (Township) R51E (Range) MPM (Meridian)

The well is located 1990 ft. from {S} line and 660 ft. from {E} line of Sec. 19

LOCATE ACCURATELY ON PLAT ON BACK OF THIS FORM THE WELL LOCATION, AND SHOW LEASE BOUNDARY

The elevation of the derrick floor above the sea level is 2101 RKB.

READ CAREFULLY — **DETAILS OF PLAN OF WORK** — READ CAREFULLY

(State names of and expected depths to objective sands; show size, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work, particularly all details results Shooting, Acidizing, Fracturing.)

DETAILS OF WORK
RESULT

See attached workover sheet.

RECEIVED
FEB 17 1964
OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA - BILLINGS

Approved subject to conditions on reverse of form

Date FEB 18 1964

By ORIGINAL SIGNED BY:
J. R. Hug, Supervisor
Title
District Office Agent

Company Murphy Oil Corporation

By ORIGINAL SIGNED BY M. T. JAMES

Title Field Production Superintendent

Address P.O. Box 347, Poplar, Montana 59255

NOTE:—Reports on this Form to be submitted to the District Agent for Approval in Quadruplicate.

WHEN USED AS PERMIT TO DRILL, THIS EXPIRES 90 DAYS FROM DATE OF APPROVAL

OVER

Form 9-331a
(Feb. 1961)

Budget Bureau No. 42-R358.4.
Form Approved.

Land Office ...
Lease No. Reynolds
Unit East Poplar

(SUBMIT IN TRIPLICATE)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

RECEIVED
MAY 5 1964
MONTANA

SUNDRY NOTICES AND REPORTS ON WELLS

NOTICE OF INTENTION TO DRILL		SUBSEQUENT REPORT OF WATER SHUT-OFF	
NOTICE OF INTENTION TO CHANGE PLANS		SUBSEQUENT REPORT OF SHOOTING OR ACIDIZING	
NOTICE OF INTENTION TO TEST WATER SHUT-OFF		SUBSEQUENT REPORT OF ALTERING CASING	
NOTICE OF INTENTION TO RE-DRILL OR REPAIR WELL		SUBSEQUENT REPORT OF RE-DRILLING OR REPAIR	
NOTICE OF INTENTION TO SHOOT OR ACIDIZE		SUBSEQUENT REPORT OF ABANDONMENT	
NOTICE OF INTENTION TO PULL OR ALTER CASING		SUPPLEMENTARY WELL HISTORY	X
NOTICE OF INTENTION TO ABANDON WELL			

(INDICATE ABOVE BY CHECK MARK NATURE OF REPORT, NOTICE, OR OTHER DATA)

May 4, 1964

Well No. 6 is located 1980 ft. from {N/S} line and 660 ft. from {E/W} line of sec. 10

NE/4 SE/4 Section 10	28N	51E	MPM
(¼ Sec. and Sec. No.)	(Twp.)	(Range)	(Meridian)
East Poplar Unit	Roosevelt		Montana
(Field)	(County or Subdivision)		(State or Territory)

The elevation of the derrick floor above sea level is 2101 ft. ORIGINAL FORWARDED TO CASPER

DETAILS OF WORK

(State names of and expected depths to objective sands; show sizes, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work)

Due to Packer rubber failures (3) the dual producing of EPU #6 from the B & C Zones was temporarily discontinued until more durable equipment can be found or designed. EPU #6 is now producing from the B Zones only. The C Zone is shut in with BC Packer.

Approved MAY 5 1964

(ORIG. SGD.) HILLARY A. ODEN,

District Engineer

I understand that this plan of work must receive approval in writing by the Geological Survey before operations may be commenced.

Company Murphy Oil Corporation

Address P.O. Box 547

Poplar, Montana

ORIGINAL SIGNED BY M. T. JAMES

By ...

Title Field Production Superintendent

GPO 914974

ORIGINAL FORWARDED TO CASPER

Form No. 2

GENERAL RULES
201, 202, 213,
216, 219, 233.1

(SUBMIT IN QUADRUPLICATE)
TO
OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA
BILLINGS OR SHELBY

NOTICE!
THIS FORM BECOMES A PERMIT WHEN STAMPED APPROVED BY AN AGENT OF THE COMMISSION.

SUNDRY NOTICES AND REPORT OF WELLS

Notice of Intention to Drill		Subsequent Report of Water Shut-off	
Notice of Intention to Change Plans		Subsequent Report of Shooting, Acidizing, Cementing	
Notice of Intention to Test Water Shut-off		Subsequent Report of Altering Casing	
Notice of Intention to Redrill or Repair Well		Subsequent Report of Redrilling or Repair	
Notice of Intention to Shoot, Acidize, or Cement		Subsequent Report of Abandonment	
Notice of Intention to Pull or Alter Casing		Supplementary Well History	X
Notice of Intention to Abandon Well		Report of Fracturing	

(Indicate Above by Check Mark Nature of Report, Notice, or Other Data)

May 4, 1964

Following is a {[redacted] / report of work done} on land {[redacted] / leased} described as follows:

LEASE Reynolds

MONTANA (State) Roosevelt (County) East Poplar (Field)

Well No. 6 NE/4 SE/4 Section 10 T28N R51E MPM
(m. sec.) (Township) (Range) (Meridian)

The well is located 1980 ft. from {[redacted] / S} line and 660 ft. from {E / W} line of Sec. 10

(Locate accurately on Plat on back of this form the well location, and show lease boundary.)

The elevation of the derrick floor above the sea level is 2101 KKB

RECEIVED
MAY 5 1964
OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF MONTANA - BILLINGS

READ CAREFULLY — DETAILS OF PLAN OF WORK — READ CAREFULLY

(State names of and expected depths to objective sands; show size, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work, particularly all details results Shooting, Acidizing, Fracturing.)

DETAILS OF WORK
RESULT

Due to Packer rubber failures (3) the dual producing of EFU #6 from the B & C Zones was temporarily discontinued until more durable equipment can be found or designed. EFU #6 is now producing from the B Zones only. The C Zone is shut in with BC Packer

Approved subject to conditions on reverse of form

Date MAY 5 - 1964

By ORIGINAL SIGNED BY: J. A. Hug, Supervisor
Title
District Office Agent

Company Murphy Oil Corporation

By ORIGINAL SIGNED BY M. T. JAMES

Title Field Production Superintendant

Address P.O. Box 547, Poplar, Montana 59255

NOTE:—Reports on this Form to be submitted to the District Agent for Approval in Quadruplicate.

WHEN USED AS PERMIT TO DRILL, THIS EXPIRES 90 DAYS FROM DATE OF APPROVAL

OVER

Geological Data

G-D. EBU #6

35 P

52-7

U. S. LAND OFFICE .....

SERIAL NUMBER .....

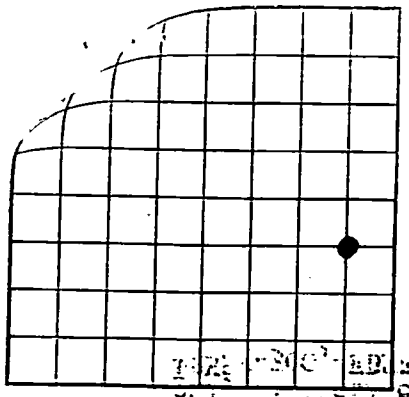
LEASE OR PERMIT TO PROSPECT Fee Land (Reynolds)

UNITED STATES

DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

RECEIVED
SEP 4 1952
U. S. GEOLOGICAL SURVEY
BILLINGS, MONTANA



LOCATE WELL CORRECTLY

LOG OF OIL OR GAS WELL

Company C. H. Murphy, Jr., Et Al Address Box 76, Poplar, Montana

Lessor or Tract East Poplar Unit Field East Poplar State Montana

Well No. 6 Sec. 10 T. 28N R. 52E Meridian ..... County Roosevelt

Location 1980 ft. [N.] of S Line and 660 ft. [E.] of E Line of Sec. 10 Elevation 2101
(Derrick floor relative to sea level)

The information given herewith is a complete and correct record of the well and all work done thereon so far as can be determined from all available records.

Signed Harold Milam

Date August 29, 1952 Title District Production Supt.

The summary on this page is for the condition of the well at above date.

Commenced drilling 7-12, 19 52 Finished drilling 8-16, 19 52

OIL OR GAS SANDS OR ZONES

(Denote gas by G)

No. 1, from 5612 to 5620 No. 4, from ..... to .....

No. 2, from 5621 to 5639 No. 5, from ..... to .....

No. 3, from 5773 to 5786 No. 6, from ..... to .....

IMPORTANT WATER SANDS

No. 1, from ..... to ..... No. 3, from ..... to .....

No. 2, from ..... to ..... No. 4, from ..... to .....

CASING RECORD

Size casing	Weight per foot	Threads per inch	Make	Amount	Kind of shoe	Cut and pulled from	Perforated From—	Perforated To—	Purpose
13 3/8	48	8	Nat'l	46'	None				Conductor
9 5/8	36	8	Nat'l	1274	Baker				Surface Pipe
5½	15.50	8	German	5773	Baker				Oil String

MUDDING AND CEMENTING RECORD

Size casing	Where set	Number sacks of cement	Method used	Mud gravity	Amount of mud used
13 3/8	48	40	Hand		
9-5/8	36	400	Pump & Plug		
5½	15.50	250	Pump & Plug		

PLUGS AND ADAPTERS

Heaving plug—Material ..... Length ..... Depth set .....

Adapters—Material ..... Size .....

SHOOTING RECORD

Size	Shell used	Explosive used	Quantity	Date	Depth shot	Depth cleaned out

FOLD | MARK

CORE ANALYSIS REPORT

FOR

MURPHY CORPORATION

EAST POPLAR UNIT NO. 6 WELL

EAST POPLAR FIELD

ROOSEVELT COUNTY, MONTANA

[redacted]

CORE LAB

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

October 3, 1952

Murphy Corporation
1125 University Building
Denver, Colorado

Attention: Mr. Gordon Kirby

Subject: Core Analysis
East Poplar Unit No. 6 Well
East Poplar Field
Roosevelt County, Montana

Gentlemen:

Diamond conventional cores from the subject well in the Judith River, Heath, Charles and Madison formations have been sampled and quick-frozen by a representative of Core Laboratories, Inc. and later analyzed in our Williston, North Dakota laboratory. Results of the analysis are presented in tabular and graphical form on the attached Coregraph and Special Analysis Core Report. Water base mud was used as the drilling fluid.

Permeability and porosity measurements were made on core from the Judith River formation from 765 to 784 feet. Formation analyzed from 790 to 820 feet is interpreted to be water productive.

Heath formation analyzed from 4894 to 4911 feet is interpreted to be low capacity, water productive.

Top @ 3.55 o'

Charles formation analyzed by conventional methods from 5490 to 5512 feet is interpreted to be essentially nonproductive. Charles and Madison formations analyzed by conventional methods from 5750 to 5775 feet also are interpreted to be essentially nonproductive due to low permeability and porosity.

Charles formation analyzed by special analysis methods from 5606 to
B-1 5614.5 and from 5623 to 5634 feet is interpreted to be essentially oil productive.
B-2

Madison formation analyzed by special analysis methods from 5775 to 5786 feet is interpreted to be essentially oil productive where permeable.

Recovery estimates for the zones, 5606 to 5614.5, 5623 to 5634 and 5775 to 5786 feet, are given on page one. Samples with an asterisk in the permeability column of the Special Analysis Core Report are samples that were broken or crushed and were therefore unsuitable for special permeability analysis. The broken and crushed samples represent the most permeable formation, however, so the samples denoted by an asterisk in the probable production column are assumed to be productive and are included in the recovery estimates. Please note that this is a departure from our previous procedure.

We hope these data prove beneficial in the evaluation of this well.

Very truly yours,

Core Laboratories, Inc.

J. D. Harris (PE)

J. D. Harris,
District Engineer

JDH:ma

FORM F-11A

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS

Page 1 of 1
File FL 25-293
Well East Poplar Unit No. 6

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

CORE SUMMARY

FORMATION NAME	Charles	Charles	Madison
DEPTH, FEET	5606.0-5614.5	5623.0-5634.0	5775.0-5786.0
% CORE RECOVERY	100	100	100
FEET OF PERMEABLE, PRODUCTIVE FORMATION RECOVERED	8.5	11.0	11.0
AVERAGE PERMEABILITY MILLIDARCYS	Max.: 0.2 90°: 0.04	Max.: 0.8 90°: 0.02	Max.: 0.1 90°: 0.05
CAPACITY—AVERAGE PERMEABILITY X FEET PRODUCTIVE FORMATION	Max.: 1.7 90°: 0.34	Max.: 8.8 90°: 0.22	Max.: 1.1 90°: 0.55
AVERAGE POROSITY, PERCENT	11.7	11.0	9.8
AVERAGE RESIDUAL OIL SATURATION, % PORE SPACE	15.2	15.6	30.7
GRAVITY OF OIL, °A.P.I.	39	39	39
AVERAGE TOTAL WATER SATURATION, % PORE SPACE	39.9	39.6	39.7
AVERAGE CALCULATED CONNATE WATER SATURATION, % PORE SPACE	39.9	39.6	39.7
SOLUTION GAS-OIL RATIO, CUBIC FEET PER BARREL (1)	490	490	520
FORMATION VOLUME FACTOR—VOLUME THAT ONE BARREL OF STOCK TANK OIL OCCUPIES IN RESERVOIR (1)	1.29	1.29	1.31

CALCULATED RECOVERABLE OIL

{ Prediction dependent upon complete isolation of each division. Structural position of well, total permeable thickne of oil zone and drainage area of well should be considered.

BY NATURAL OR GAS EXPANSION, BBLS. PER ACRE FOOT (2)	100	94	81
INCREASE DUE TO WATER DRIVE, BBLS. PER ACRE FOOT	185	172	35
TOTAL AFTER COMPLETE WATER DRIVE, BBLS. PER ACRE FOOT (3)	285	266	116

Core Laboratories, Inc.

J D Harris (PE)
J. D. Harris

NOTE:

(*) REFER TO ATTACHED LETTER.

(1) REDUCTION IN PRESSURE FROM estimated SATURATION PRESSURE TO ATMOSPHERIC PRESSURE.

(2) AFTER REDUCTION FROM ORIGINAL RESERVOIR PRESSURE TO ZERO POUNDS PER SQUARE INCH.

(3) RESERVOIR PRESSURE MAINTAINED BY WATER DRIVE AT OR ABOVE estimated ORIGINAL SATURATION PRESSURE.

(4) NO ESTIMATE FOR GAS PHASE RESERVOIRS.

CORE LABORATORIES, INC
Petroleum Reservoir Engineering
DALLAS, TEXAS

Company Murphy Corporation — Date Report August 1, 1952 — Page ____ of ____
Well East Poplar Unit No. 6 — Cores Diamond — File ____
Field Poplar Area — Formation Judith River — Analysts RWG, WBW
County Roosevelt — State Montana — Elevation 2101' KB — Coregraph Yes
Location Sec. 10-28N-51E — Remarks Core No. 1, Perm. and porosity only

CORE ANALYSIS RESULTS

(Figures in parentheses refer to footnote remarks.)

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYS	POROSITY PER CENT	RESIDUAL SATURATION			PROBABLE PRODUCTION	REMARKS
				OIL		TOTAL WATER		
				% VOLUME	% PORE	% PORE		
1	765.5	1.3	6.5					
2	66.5	21	14.0					
3	67.5	16	17.2					
4	68.5	2.8	14.9					
5	69.5	8.7	19.1					
6	70.5	4.8	17.6					
7	71.5	4.7	17.2					
8	72.5	3.6	14.2					
9	73.5	1.2	10.7					
10	74.5	7.0	14.8					
11	75.5	8.9	18.2					
12	76.5	8.3	16.2					
13	77.5	3.9	14.0					
14	78.5	4.9	16.4					
15	79.5	1.2	12.4					
16	80.5	3.9	15.7					
17	81.5	3.6	16.3					
18	82.5	1.8	19.1					
19	83.5	1.3	16.8					

Exhibit III-6

NOTE:
(°) REFER TO ATTACHED LETTER.
(1) INCOMPLETE CORE RECOVERY—INTERPRETATION RESERVED.
(2) OFF LOCATION ANALYSES—NO INTERPRETATION OF RESULTS.

FORM P-8

CORE LABORATORIES, INC
Petroleum Reservoir Engineering
DALLAS, TEXAS

Company Murphy Corporation — Date Report August 1, 1952 — Page ____ of ____
Well East Poplar Unit No. 6 — Cores Diamond — File ____
Field Poplar Area — Formation Judith River — Analysts [redacted]
County Roosevelt State Montana — Elevation 2101' KB — Coregraph Yes
Location Sec. 10-28N-51E — Remarks ____

CORE ANALYSIS RESULTS

(Figures in parentheses refer to footnote remarks)

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYS	POROSITY PER CENT	RESIDUAL SATURATION			PROBABLE PRODUCTION	REMARKS
				OIL		TOTAL WATER		
				% VOLUME	% PORE	% PORE		
20	790.5	2.5	15.5		0.0	91.0		
21	91.5	15	28.3		0.0	73.2		
22	92.5	16	37.8		0.0	76.6		
23	93.5	93	34.3		0.0	83.7		
24	94.5	51	35.5		0.0	80.4		
25	95.5	15	33.0		0.0	77.5		
26	96.5	38	22.2		0.0	71.2		
27	97.5	18	37.9		0.0	86.3		
28	98.5	15	31.8		0.0	84.3		
29	99.5	31	34.5		0.0	87.0		
30	800.5	35	30.9		0.0	88.0		
31	01.5	38	31.8		0.0	85.0		
32	02.5	47	32.6		0.6	82.9		
33	03.5	20	27.7		0.7	87.1		
34	04.5	25	30.2		0.0	84.0		
35	05.5	16	27.5		0.0	87.3		
36	06.5	26	29.5		0.0	88.7		
37	07.5	21	26.9		0.0	86.3		
38	08.5	13	31.5		0.0	86.4		
39	09.5	11	35.0		0.0	82.8		
40	10.5	9.3	26.3		0.8	87.4		
41	11.5	13	34.9		0.0	90.6		
42	12.5	15	30.7		1.3	84.4		
43	13.5	8.7	30.6		1.3	89.0		
44	14.5	7.5	25.2		0.8	86.5		
45	15.5	17	29.3		0.5	88.0		
46	16.5	5.2	33.2		0.0	83.7		
47	17.5	2.4	37.5		0.0	84.3		
48	18.5	3.0	30.8		0.0	81.8		
49	19.5	2.6	34.5		0.0	85.4		

Exhibit III-6

NOTE:
(*) REFER TO ATTACHED LETTER.
(1) INCOMPLETE CORE RECOVERY—INTERPRETATION RESERVED.
(2) OFF LOCATION ANALYSES—NO INTERPRETATION OF RESULTS

ST #6

E L E C T R I C L O G D A T A

TYPE OF LOG	INTERVAL LOGGED
ES	421'-9761'
ES	980'-5738'
Microlog	4900'-5765'

LOG TOPS

	Depth	Datum	Thickness
Kootenai	80	+2021	
Judith River	763	+1338	756
Eagle	1159	+ 942	
Niobrara	2024	+ 77	
Carlisle	2170	- 69	
Greenhorn	2368	- 267	
Graneros	2570	- 469	1159
Upper Muddy	2717	- 616	763
Muddy Ss	2914	- 813	396
Dakota Silt	3133	-1032	
Morrison	3503	-1402	
Ellis	3913	-1812	
Rierdon	4090	-1989	1152
Piper Shale	4268	-2167	396
Piper Ls	4343	-2242	151
Gypsum Springs	4400	-2299	
Spearfish (?)	4588	-2487	
Amsden	4707	-2606	
Heath	4837	-2736	
Otter	4890	-2889	
Kibbey	5127	-3026	
Kibbey Ls	5283	-3182	
Charles	5378	-3277	
A-1 Zone	5463	-3362	3'
A-2 Zone	5478	-3377	5'
A-3 Zone	5501	-3400	9'
A-4 Zone	5510	-3409	24'
B-1 Zone	5612	-3511	8'
B-2 Zone	5629	-3528	14'
B-3 Zone	5650	-3549	8'
B-4 Zone	5684	-3583	?
B-5 Zone	5721	-3620	?
C-1 Zone	5760	-3659	?
C-2 Zone	-----	-----	-----

CORE DESCRIPTIONS

East Poplar Unit #5

Core No. 1

655-65 Rec 11'

C. T. 25, 30, 20, 20, 15/ 20, 15, 20, 15, 15/ 20, 20, 25, 30, 30/ 35, 25, 30, 25, 25/ 23, 20, 15, 20, 25/ 30, 20, 30, 32, 33/

11'0" Shale, dark grey, fairly firm, fossiliferous. No Show.

Core No. 2

685-701 Rec. 6'

C. T. 12, 17, 36, 37, 31/ 30, 35, 40, 40, 30/ 45, 40, 55, 40, 45/ 40,

6'0" Shale, dark grey, firm fossiliferous, becoming silty in bottom 6". No Show.

Core No. 3

701-728 Rec. 22½'

C. T. 20, 10, 18, 19, 18/ 12, 17, 22, 16, 15/ 10, 13, 14, 13, 13/ 23, 17, 19, 18, 11/ 16, 30, 27, 33, 31/ 35, 43

22'0" Shale, dark grey, firm, slightly fossiliferous. No Show.

0'6" Sandstone, very fine grained, light grey, unconformed, angular, numerous small black specks, no odor. No Show.

Core No. 4

728-48 Rec. 9½'

C. T. 15, 13, 13, 15, 15/ 15, 12, 13, 12, 13/ 17, 15, 15, 15, 13/ 19, 17, 31, 20, 18/

9'6" Shale, dark grey, firm, becoming silty toward base, slightly fossiliferous. No gas odor. No Show.

Core No. 5

748-52 Rec. 5'

C. T. 10, 13, 25, 50

5'0" Shale, dark grey, firm, slightly fossiliferous slightly silty. No Show.

Core No. 6

752-790 Rec. 32'

C. T. 20, 15, 15, 15, 13/ 10, 12, 11, 11, 12/ 12, 11, 11, 15, 4/ 4, 4, 3, 3, 8/ 5, 3, 5, 7, 3/ 6, 5, 5, 3, 7/ 5, 5, 5, 4, 4/4, 4, 11,

13'0" Shale, dark gray, fairly soft, slightly fossiliferous, sticky. No Show.

19'0" Sandstone, greenish-gray, fine-medium grained, friable in top 2' very porous in top 2' becoming very argillaceous toward base of unit, numerous thin streaks dark gray sandy shale, slightly fossiliferous in shaly streaks, no gas odor.

Core No. 7

790-820 Rec. 30'

C. T. 8, 8, 8, 8, 4/ 3, 3, 6, 5, 8/ 8, 9, 9, 11, 10/ 11, 12, 9, 12, 14/ 14, 13, 8, 8, 10/ 9, 8, 7, 6, 6

15'0" Sandstone, greenish gray, fine- medium grained, fairly firm, very friable, few thin argillaceous streaks, fair porosity and permeability, very fossiliferous. No Show.

15'0" Sandstone, dark gray, very argillaceous, fine grained, fairly firm, poor porosity and permeability, very fossiliferous. No Show.

Core No. 8

4880-4894 Rec. 12'

C. T. 12, 11, 15, 17, 23/ 20, 17, 20, 22, 30/ 29, 39, 50, 40

11'0" Shale, brick red with streaks, light gray, medium hard, breaks with conchoidal fractures. No Show.

1'0" Sandstone, brownish-gray, very fine grained, very hard tight sand grains subrounded, cemented with light gray, shaly material; shaly material slightly glauconitic, fair gas odor on fresh break, good oil stain along single vertical fracture, no odor, faint dull, yellow fluorescence.

Core No. 9

4894-4911 Rec. 17'

C. T. 22, 23, 13, 17, 17/ 19, 22, 24, 9, 6/ 15, 16, 12, 16, 20/ 20, 20

8'0" Sandstone, lavender, very fine grained, very hard tight secondary quartz cement, sand grains sub-rounded, single tight, vertical fracture running length of unit, good oil stain and orange-yellow fluorescence.

along fracture, no show in mass of core.

1'0" Pebble conglomerate, large reddish brown chert pebbles imbedded in a matrix of light gray, medium grained, porous, angular, sandstone, few small well-rounded limestone pebbles, sandstone slightly glauconitic, fair gas odor on fresh break, some stain on sand grains, some dull, yellow fluorescence in spots.

0'6" Sandstone, lavender, very fine grained, very hard, sand grains cemented with secondary quartz, sand grains angular, sub-rounded; faint gas odor on fresh break, slight oil stain on sand grains. No fluorescence or oil odor.

1'0" Sandstone, dark purple, medium gray, friable, very porous and permeable, sand grains fairly well-rounded, slightly glauconitic, good gas odor on fresh break, fair, even, dull, yellow fluorescence, fair oil stain on sand grains.

0'6" Sandstone, light gray, medium grained, sand grains angular to rounded, slightly glauconitic, cemented with clay and shale. No Show.

1'0" Sandstone, lavender, very fine grained, tight, grains cemented with quartz and clay, sand grains sub-rounded, entire unit very hard, faint gas odor on fresh break, no stain or fluorescence, two well-developed, vertical fractures with no stain or fluorescence on fracture plane.

2'0" Pebble conglomerate; dark brownish purple, medium to small pebbles of quartz, limestone and clay imbedded in matrix of light gray, medium grained, angular sandstone cemented with clay. Pebbles angular to rounded; faint gas and oil odor on fresh break, spotted dull, yellow fluorescence. Entire unit looks wet.

0'6" Sandstone, purple-brown, medium coarse grained, sand grains fairly well-rounded, good porosity and permeability, friable, cemented with clay, fair gas odor on fresh break, some oil stain on sand grains. Unit looks wet.

2'6" Sandstone; light gray, fine grained with sand grains angular to sub-rounded, well cemented with calcareous cement, very hard and tight, single vertical fracture running length of unit, no show along fracture plane.

Core No. 10

5464-5483 Rec. 17'

C. T. 38, 37, 35, 33, 27/ 34, 26, 29, 21, 10/ 5, 14, 21, 18, 29/ 39, 24, 24, 24

1'0" Limestone; light gray, fine crystalline, very hard with numerous paper thin black shale partings, few very tight irregular incipient fractures. No Show.

8'0" Limestone; medium brownish-gray, medium crystalline, very hard, numerous black stylolitic partings, numerous large white inclusions of anhydrite, occasional small pin-point vugs bleeding free oil. Fair oil odor on fresh break; faint yellow fluorescence, mass of core very hard and tight.

1'0" Dolomite; light gray, medium hard, earthy, dense. No Show.

7'0" Dolomite, light gray, medium hard, earthy with numerous large white inclusions of anhydrite, few thin streaks brownish-gray limestone, single small pin-point vugs bleeding oil. No Show in mass of Core.

Core No. 11

5483-5512 Rec. 31'

C. T. 25, 20, 30, 28, 27/ 20, 17, 16,19, 30/ 50, 40, 45, 50, 55/ 35, 38, 46, 40/ 23, 27, 29, 25, 32/ 24, 30, 28, 36

1'0" Anhydrite, dark brownish-gray, medium soft, numerous smooth slickenside surfeces. No Show.

2'6" Dolomite, dark gray with numerous white angular fragments of light gray anhydrite as inclusions. Dolomite is fine crystalline, medium hard, anhydrite soft, fine crystalline.

1'0" Dolomite, dark gray, very fine crystalline, hard, with numerous angular fragments of light gray, earthy dolomite. No Show.

4'0" Anhydrite, light gray-white, fine crystalline, medium soft, dense, No Show.

22'6" Limestone, dark brownish-gray, amorphous, very fine crystalline, very hard, very highly fractured with numerous tight irregular fractures, numerous black stylolitic partings, fair oil odor and faint golden-yellow fluorescence along fracture planes, fair oil odor and faint light-yellow fluorescence in mass of core.

Core No. 12

5599-5634 Rec. 35'

C. T. 20, 45, 42, 50, 45/ 60, 58, 32, 22, 21/ 26, 18, 9, 10, 10/ 15, 30, 35, 30, 25/ 30, 30, 25, 20, 20/ 10, 15, 20, 25, 25/ 25, 20, 25, 23, 47/

7'0" Anhydrite, brownish-gray, fine crystalline, medium hard, dense. No Show.

4'0" Limestone, brownish-gray, amorphous to micro-crystalline, numerous very small black calcite crystals throughout, numerous black stylolitic partings, fairly numerous irregular, fairly tight fractures, good oil odor, good oil stain, good even, golden-yellow fluorescence, fair

to good inter-crystalline porosity with free oil bleeding in spots.

5'0" Limestone, dark brownish-gray, fine to medium crystalline, medium hard, good to fair inter-crystalline porosity, numerous small pin point vugs, few black stylolitic partings, good oil odor, good even stain, even golden-yellow fluorescence, free oil bleeding from top 1' of unit.

9'0" Anhydrite, light gray, micro-crystalline, with numerous thin black shale partings, free oil bleeding from bottom 1' of unit.

10' Limestone, dark brownish-gray, fine to medium crystalline, medium hard, fair streaked inter-crystalline porosity, some vuggy porosity, fairly numerous irregular, short fractures with good porosity and permeability, good oil odor, even oil stain, in top 5', becoming streaked staining in bottom 5', good even, golden-yellow fluorescence in top 5', becoming streaked in bottom 5'.

Core No. 13

5750-75 Rec. 25'

C. T. 33, 42, 17, 18, 21/ 21, 22, 22, 19, 20/ 21, 21, 23, 20, 18/ 20, 25, 17, 17, 17/ 13, 11, 13, 16, 16/

5'0" Limestone, dark gray-blank, very hard, micro-crystalline, few very tight vertical, incipient fractures. No Show.

5'0" Dolomite, dark gray to light gray, very hard, dense, amorphous to micro-crystalline, becoming more limy toward base. No Show.

3'0" Limestone, dark brownish-gray, very fine to micro-crystalline, very hard, few very tight, incipient, vertical fractures, fracture plane very thinly covered with anhydrite crystals. No Show.

1'6" Dolomite, medium gray, very fine-microcrystalline, very hard, few very tight incipient, vertical fractures. No Show.

1'6" Limestone, brownish-gray, microcrystalline, very hard, few very tight, incipient, vertical fractures. No Show.

1'0" Dolomite, light gray, fine crystalline, very hard. Few tight, vertical incipient fractures. No Show.

8'0" Limestone, brownish-gray, micro-fine crystalline, very hard, few very tight, vertical fractures, slight amount of poor inter-crystalline porosity, faint oil odor on fresh break, spotty weak dull, yellow fluorescence in mass of core. Entire unit very tight.

Core No. 14

5775-86 Rec. 11'

C. T. 15, 22, 23, 20, 10/ 10, 15, 20, 25, 30/

1'6" Limestone, brownish-gray, fine crystalline, very hard, single very tight, vertical fracture running length of unit, faint oil odor on fresh break, weak dull yellow fluorescence in mass of core, no show along fracture plane.

9'6" Limestone, dark brownish-gray, fine crystalline, medium hard, good inter-crystalline porosity, single very tight, vertical fracture running length of unit, good oil odor and stain, good even golden-yellow fluorescence in mass of core, free oil bleeding from core in spots and along fracture.

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CORE ANALYSIS

Company MURPHY CORPORATION Date Report August 1, 1952 Page of

Well East Poplar Unit No. 6 Cores Diamond File

Field Poplar Area Formation Judith River Analysts RWH:WBM

County Roosevelt State Montana Elevation 2101' KB Coregraph Yes

Location Sec. 10-28N-51E Remarks Core No. 1. Perm. and porosity only

CORE ANALYSIS RESULTS

Sample Number	Depth Feet	Permeability Millidarcys	Porosity Per Cent
1	765.5	1.3	6.5
2	66.5	31	14.0
3	67.5	6	17.2
4	68.5	2.8	14.9
5	69.5	8.7	19.1
6	70.5	4.8	17.6
7	71.5	4.7	17.2
8	72.5	3.6	14.2
9	73.5	1.2	10.7
10	74.5	7.0	14.8
11	75.5	8.9	18.2
12	76.5	8.3	16.2
13	77.5	3.9	14.0
14	78.5	4.9	16.4
15	79.5	1.2	12.4
16	80.5	3.9	15.7
17	81.5	3.6	16.3
18	82.5	1.8	19.1
19	83.5	1.3	16.8

Company MURPHY CORPORATION Date Report August 1, 1952 Page ___ of ___

Well East Poplar Unit No. 6 Cores Diamond File ___

Field Poplar Area Formation Judith River Analysts RWH:WBM

County Roosevelt State Montana Elevation 2101' KB Coregraph Yes

Location Sec. 10-28N-51E Remarks ___

CORE ANALYSIS RESULTS

Sample Number	Depth Feet	Permeability Millidarcys	Porosity Per Cent	Residual Saturation Oil % Volume	Residual Saturation Oil % Pore	Residual Saturation Total Water % Pore
20	790.5	2.5	15.5	0.0		91.0
21	91.5	15	28.3	0.0		73.2
22	92.5	16	37.8	0.0		76.6
23	93.5	93	34.3	0.0		83.7
24	94.5	51	35.5	0.0		80.4
25	95.5	15	33.0	0.0		77.5
26	96.5	38	22.2	0.0		71.2
27	97.5	18	37.9	0.0		86.3
28	98.5	15	31.8	0.0		84.3
29	99.5	31	34.5	0.0		87.0
30	800.5	35	30.9	0.0		88.0
31	01.5	38	31.8	0.0		85.0
32	02.5	47	32.6	0.6		82.9
33	03.5	20	27.7	0.7		87.1
34	04.5	25	30.2	0.0		84.0
35	05.5	16	27.5	0.0		87.3
36	06.5	26	29.5	0.0		88.7
37	07.5	21	26.9	0.0		86.3
38	08.5	13	31.5	0.0		86.4
39	09.5	11	35.0	0.0		82.8
40	10.5	9.3	26.3	0.8		87.4
41	11.5	13	34.9	0.0		90.6
42	12.5	15	30.7	1.3		84.4
43	13.5	8.7	30.6	1.3		89.0
44	14.5	7.5	25.2	0.8		86.5
45	15.5	17	29.3	0.5		88.0
46	16.5	5.2	33.2	0.0		83.7
47	17.5	2.4	37.5	0.0		84.3
48	18.5	3.0	30.8	0.0		81.8
49	19.5	2.6	34.5	0.0		85.4

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Well East Poplar Unit No. 6 Cores Diamond File

Field Poplar Area Formation Heath Analysts WBM

County Roosevelt State Montana Elevation 2101' KB Coregraph Yes

Location Sec. 10-28N-51E Remarks

CORE ANALYSIS RESULTS

Sample Number	Depth Feet	Permeability Millidarcys	Porosity Per Cent	Residual Saturation Oil %Volume	Residual Saturation Water %Pore	Residual Saturation Total %Pore
50	4894.5	0.1	8.3	0.0	88.0	
51	95.5	0.5	7.2	0.0	72.2	
52	96.5	0.3	6.2	0.0	59.6	
53	97.5	0.3	10.1	2.0	62.5	
54	98.5	0.4	8.0	2.5	67.5	
55	99.5	0.8	6.3	0.0	63.4	
56	4900.5	0.1	6.8	0.0	64.7	
57	01.5	0.2	8.1	2.5	61.8	
58	02.5	2.4	21.5	0.0	61.4	
59	03.5	0.0	2.4	0.0	41.6	
60	04.5	2.8	17.0	2.9	58.1	
61	05.5	30	9.6	0.0	68.8	
62	06.5	0.2	7.4	0.0	59.5	
63	07.5	0.6	12.0	0.0	70.9	
64	08.5	0.7	11.7	0.0	78.6	
65	90.5	3.6	20.4	0.0	61.7	
66	10.5	1.0	5.5	0.0	32.8	

Company MURPHY CORPORATION Date Report August 12, 1952 Page ___ of ___

Well East Poplar Unit No. 6 Cores Diamond File ___

Field Poplar Area Formation Charles Analysts RWH, WBM, HT, NO

County Roosevelt State Montana Elevation 2101' KB Coregraph Yes

Location Sec. 10-28N-51E Remarks ___

CORE ANALYSIS RESULTS

Sample Number	Depth Feet	Permeability Millidarcys	Porosity Per Cent	Residual Saturation Oil % Volume	Residual Saturation Oil %Pore	Residual Saturation Total WAter %Pore
67	5490.5	0.0	2.8		7.1	21.4
68	91.5	0.0	1.9		10.5	47.3
69	92.5	0.0	1.4		14.3	28.6
70	93.5	0.0	2.6		0.0	50.0
71	94.5	0.0	1.1		0.0	36.4
72	95.5	0.0	0.8		0.0	50.0
73	96.5	0.0	3.4		14.7	55.9
74	97.5	0.0	3.8		5.3	68.5
75	98.5	0.0	2.2		9.1	45.3
76	99.5	0.0	1.4		14.3	42.9
77	5500.5	0.0	2.2		9.1	27.3
78	01.5	0.0	1.4		0.0	28.6
79	02.5	0.0	1.3		0.0	53.6
80	03.5	0.0	1.7		0.0	23.5
81	04.5	0.0	2.2		0.0	18.2
82	05.5	0.0	2.9		0.0	44.8
83	06.5	0.0	2.0		10.0	45.0
84	07.5	0.0	2.6		19.2	34.6
85	08.5	0.0	2.0		25.0	45.0
86	09.5	0.0	1.3		15.4	30.8
87	10.5	0.0	1.8		11.1	61.2
88	11.5	0.0	3.5		5.7	74.4

Company MURPHY CORPORATION Date Report August 20, 1952 Page of

Well East Poplar Unit No. 6 Cores Diamond File

Field Poplar Area Formation Charles Analysts RWH, WBM

County Roosevelt State Montana Elevation 2101' KB Coregraph Yes

Location Sec. 10-28N-51E Remarks Service No. 9

CORE ANALYSIS AND INTERPRETATION

Sample Number	Depth Feet	Permeability Millidarcys		Porosity Per Cent	Residual Liquid Saturation % Pore Space	
		Kmax	K90		Oil	Total Water
89	5605.3-06.5	<0.1	<0.1	3.7	21.6	27.0
90	08.0	*	*	12.5	16.0	36.0
91	09.5	*	*	7.5	12.0	38.7
92	11.0	0.3	0.1	14.7	15.0	56.5
93	12.4	0.3	<0.1	13.2	17.4	35.6
94	13.5	0.3	<0.1	14.6	8.9	43.1
95	14.5	0.1	<0.1	7.4	21.6	29.7
96	5623.0-23.6	<0.1	<0.1	3.3	33.3	18.2
97	25.0	0.3	<0.1	9.9	19.2	37.4
98	26.5	*	*	15.4	13.6	37.0
99	28.0	0.3	<0.1	13.5	16.3	30.4
100	29.4	*	*	12.3	10.6	46.4
101	31.8	*	*	8.9	12.4	50.6
102	33.0	*	*	11.9	10.1	41.2
103	34.0	*	*	13.0	9.2	55.4

Permeability:
* Unsuitable for analysis

Company MURPHY CORPORATION Date Report August 19, 1952 Page ___ of ___

Well East Poplar Unit No. 6 Cores Diamond File ___

Field East Poplar Formation Charles-Madison Analysts RWH, WBM

County Roosevelt State Montana Elevation 2101' KB Coregraph Yes

Location Sec. 10-28N-51E Remarks Service No. 4

CORE ANALYSIS RESULTS

Sample Number	Depth Feet	Permeability Millidarcys	Porosity Per Cent	Residual Saturation		
				Oil		Total Water
				% Volume	% Pore	% Pore
104	5750.5	0.0	1.9	0.0		68.4
105	51.5	0.0	3.1	0.0		67.8
106	52.5	0.0	2.2	0.0		77.3
107	53.5	0.0	4.7	0.0		83.0
108	54.5	0.0	3.6	0.0		75.0
109	55.5	0.0	5.9	18.6		50.9
110	56.5	0.0	3.4	26.5		38.2
111	57.5	0.1	6.1	44.2		32.8
112	58.5	0.2	7.5	2.7		66.6
113	59.5	0.0	3.2	6.3		68.8
114	60.5	0.0	1.8	0.0		33.3
115	61.5	0.0	1.3	0.0		69.1
116	62.5	0.0	1.3	0.0		46.1
117	63.5	0.0	5.8	19.0		51.7
118	64.5	0.0	3.9	0.0		61.6
119	65.5	0.0	1.7	0.0		41.2
120	66.5	0.0	2.1	0.0		52.4
121	67.5	0.0	3.0	0.0		50.0
122	68.5	0.0	4.1	0.0		85.3
123	69.5	0.0	6.7	3.0		80.5
124	70.5	0.0	6.1	0.0		78.6
125	71.5	0.1	7.3	2.7		86.4
126	72.5	0.2	9.4	30.9		58.5
127	73.5	0.1	7.8	41.0		48.6
128	74.5	0.3	8.1	16.1		67.8

Company MURPHY CORPORATION Date Report August 20, 1952 Page of

Well East Poplar Unit No. 6 Cores Diamond File

Field East Poplar Formation Madison Analysts RWH, MBM

County Roosevelt State Montana Elevation 2101' KB Coregraph Yes

Location Sec. 10-28N-51E Remarks Service No. 9

CORE ANALYSIS RESULTS

Sample Number	Depth Feet	Permeability Millidarcys Kmax	K90	Porosity Per Cent	Residual Saturation Oil % Volume	Oil % Pore	Total Water % Pore
129	5775.0-76.0	0.1	0.1	4.4		18.2	47.8
130	76.8	0.1	0.1	6.0		33.3	33.3
131	77.8	0.1	0.1	8.3		39.8	30.2
132	78.7	0.1	0.1	10.7		34.6	35.5
133	80.1	0.2	0.1	13.7		29.9	45.2
134	81.0	0.1	0.1	11.6		29.3	47.5
135	82.4	0.1	0.1	10.7		28.0	44.9
136	83.5	0.1	0.1	9.9		31.3	44.5
137	84.7	0.4	0.1	10.7		35.5	30.8
138	86.0	*	*	11.7		27.4	36.8

Permeability:
* Unsuitable for analysis.

D R I L L S T E M T E S T S

DST #1, 769-789, Johnston Tool, ½" bottom choke, no water cushion. Tool open @ 5:44 A. M., 7-17-52. Bubble in 10" water. Fair blow throughout. No gas to surface. Packer failed after 14 minutes. Recovered 390' mud. IBHFP:0 Hydro: 500#.

DST #2, 793-820, ½" bottom choke, no water cushion. Tool open 5:37 A. M. for 30 minutes. Weak blow for 2 minutes, occasional bubble next 18 minutes. No blow last 10 minutes. Shut in 10 minutes. Recovered 10' mud; IBHFP: 0 FBHFP; 0 BHSIP: 0 Hydro: 550#.

DST #3, 4895-4911, 5/8" bottom choke, no water cushion. Tool open 1 hour, closed 15 minutes; open with good blow. Good blow throughout test. Recovered 85' mud cut with black oil and gas. Not enough free oil for gravity test. 135' salt water. Chlorides: 28,000 PPM. IBHFP: 0 FBHFP: 50# BHSIP: 2325# Hydro: 2675#.

DST #4, 5489-5512, with Johnston Tool, ½" bottom choke, no water cushion. Tool open 4 hours with fair, steady blow throughout test. Tool closed 20 minutes. Recovered 1659' salt water. Chlorides: 116,500. IBHFP: 0 FBHFP: 800# BHSIP: 2900# Hydro: 3200#.

DST #5, 5604-5634, Johnston Tool, ½" bottom choke, no water cushion. Tool open At 3:37 P. M. for 1 hour; strong blow throughout, shut in 10 minutes. Recovered 1135' oil, 135' oil cut mud, 110' black salt water. Chlorides: 75,000 PPM. IBHFP: 300# FBHFP: 625# BHSIP: 2850# Hydro: 3300#.

DST #6, 5771,86, ½" bottom choke, no water cushion. Tool open 4 hours, closed 15 minutes. Recovered 70' oil, 152' heavily oil and gas cut mud. Chloride: 4,000 PPM on mud filtrate. IBHFP: 0 FBHFP: 50# BHSIP: 3100# Hydro: 3400#.

COMPLETION DATA

Ran 186 joints (5761.57') 5½" OD 15.5# J-55 German casing with shoe 12' off bottom. RKB @ 5773'. Checked bottom with pipe @ 5785'(Driller's measurement 5786'; Schlumberger 5788'). Centralizers @ 5604', 5654', 5759'; Scratchers @ 5597-5602', 5605-5610', 5612-26', 5638-53', 5748-58', 5761-66'. Cemented with 250 sacks cement, 5 sacks gel, pumped plug with 1400#. Released pressure and float held. Pipe rotated throughout. Plug down @ 7:30 P. M., 8-17-52.

8-21-52. Tested casing with 1200# for 30 minutes. Held o.k. Drilled plug with 4 3/4" bit and Baker casing scraper. Cheecked bottom casing @ 5776' and bottom of hole @ 5788'. Pulled tubing and perforated with 4 jet shots per foot from 5612-5620' and 5629-39'. Ran wire line junk basket and set Baker Model "D" packer @ 5758'. Ran 2 3/8" OD 4.7# J-55 tubing as follows:

RKB to top of tubing	11.00'
1 joint 2 3/8" OD tubing	31.95'
1 2 3/8" OD tubing sub	4.12'
183 joints 2 3/8" OD tubing	5708.98'
1 Otis type "F" side door choke	1.35'
1 No. 30 Baker Seal nipple & locator sub	.60'
1 No. 1 Baker seal nipple	1.99'
2 2 3/8" OD flush joint subs	20.41'
1 2 3/8" OD flush joint nipple	2.06'
	5782.43

Set tubing on packer with 4000# pressure. Installed Xmas Tree. Lifted tubing clear of packer and displaced mud with water. Acidized "C" Zone with 1000 gallons acid. Broke formation with 1800#. Acid pumped in at 1200#. Cleaned well into pits for 3 hours. Acidized "B" Zone with 1000 gallons acid. Broke formation with 1900#. Acid pumped in at 1900#. Flowed both zones into pits for 3 hours. Turned into treater at 5:30 P. M., 8-21-52, turned into tanks at 8:00 P. M., 8-21-52. Production from both zones, 271.17 barrels in 8 hours through 13/64" casing choke, 8/64" tubing choke, CP 300#, TP 975#. Both zones making approximately 3% wash water and BS&W.

Rig released 7:00 A. M., 8-22-52.

NOTE: 7-18-53. REPLACED OTIS BLANK CHOKE W/OTIS SIDE DOOR CHOKE TO BLANK OFF "C" ZONE & PRODUCE "B" ZONES THRU TUBING. JO

PRODUCTION TEST DATA

DATE OF TEST: 8-22-52

	Total Fluid	Per Cent BS&W	C. P. Flwg.	Choke Size
1st Hour	21.66	3	250	1/4
2nd Hour	24.36	4	200	1/4
3rd Hour	21.65	6	200	1/4
4th Hour	21.66	35 *	200	1/4
	* Acid Water and Mud. 7.58 water, 14.08 oil.			
1st Hour	17.60	.2	325	12/64
2nd Hour	16.24	1	325	12/64
3rd Hour	20.30	1	325	12/64
4th Hour	16.24	1	325	12/64
1st Hour	8.12	.2	500	8/64
2nd Hour	10.82	.3	500	8/64
3rd Hour	8.12	.2	500	8/64
4th Hour	8.12	.2	500	8/64
1st Hour	62.26	2	725	1/4
2nd Hour	69.02	1	725	1/4
3rd Hour	54.14	.2	725	1/4

C. H. MURPHY JR., ET AL

East Poplar Unit #6 (Reynolds)
N.E.¼, N.E.¼, Section 10, Twp 28N, Rge 51E
Elevation 2101 R.K.B.
Roosevelt County, Montana

SAMPLE DESCRIPTION

1500-1950	No Sample.
1950-1995	Shale; light gray, sandy, micaceous; some unconsolidated sand.
1995	Top Niobrara (Sample)
1995-2050	Shale; light gray with numerous small tan inclusions of calcareous material; some sandy shale.
2050-2085	Shale; light gray, firm, slightly sandy.
2085-2120	Shale; light gray, firm, sandy; some soft light gray limestone.
2120-2150	Shale; light gray, firm.
2150-2230	Shale; light gray, firm; some soft light gray limestone; trace of white bentonite.
2230-2260	Shale; light gray, soft, sandy; some light gray silt.
2260-2300	Shale; light gray, soft, sandy; some light gray limestone; trace of bentonite.
2300-2355	Shale; light gray, sandy.
2355	Top Greenhorn(Sample)
2355-2420	Shale; dark brownish-gray, numerous thin platy inclusions of tan calcareous material.
2420-2490	Shale; light grey, slightly calcareous, firm.
2490-2510	No Sample.
2510-2550	Shale; dark gray, calcareous, firm.
2550-2630	Shale; dark gray, calcareous, firm; some light gray silt.
2630-2920	Shale; dark gray, calcareous, firm; some gray silt.

2920	Top Muddy.
2920-2990	Sandstone; light gray to white, angular, fine-grained, numerous heavy minerals.
2990-3020	Sandstone; as above with some soft, light gray limestone; some medium gray, calcareous shale.
3020-3060	Shale; dark gray, firm, calcareous.
3060-3125	Shale; dark gray, firm, very calcareous, few thin stringers of soft light gray limestone.
3125	Top Dakota Silt.
3125-3210	Shale; dark gray, very silty, very calcareous.
3210-3260	Sandstone; light gray, coarse to medium grained, angular to sub-rounded; some black-dark gray carbonaceous shale.
3260-3360	Shale; dark gray to black, firm, carbonaceous.
3360-3430	Sandstone; light gray to white, medium to coarse grained, angular to sub-rounded.
3430-3440	Shale; dark gray to black, firm, brittle; some light gray medium grained sandstone.
3440-3460	Sandstone; white to light gray, fine to medium grained, well-rounded grains; some dark gray carbonaceous shale.
3460-3500	Shale; dark gray, firm, pyritic; trace of white fine grained sandstone.
3500	Top Jurassic-Morrison.
3500-3520	Shale, dark gray, micaceous, some ankerite pellets; trace of bentonite.
3520-3550	Shale; dark gray to black; micaceous, trace of pyrite.
3550-3570	Shale; dark gray to black, slightly sandy, trace gray silt.
3570-3620	Sandstone; light gray, glauconitic, medium grained, some black shale.
3620-3635	Shale; dark gray to black with trace of grey siltstone.
3635-3700	Sandstone; light gray, fine to medium grained, glauconitic, some black shale, trace of pyrite.
3700-3755	Shale; dark gray, with some thin stringers of fine-grained sandstone and siltstone.

3755-3780	Shale; dark gray with some light gray, crystalline limestone.
3780-3900	Shale; light-greenish gray, firm; some light gray siltstone.
3900	Top Ellis.
3900-3960	Sandstone; light gray to white, fine-medium grained, very calcareous, slightly glauconitic; some black carbonaceous shale.
3960-4010	Shale; dark grey to black, splintery; some light gray fine-grained sandstone.
4010-4075	Shale; greenish-gray, firm, slightly calcareous; few thin stringers of light gray, fine-grained calcareous sandstone toward base.
4075	Top Rierdon.
4075-4120	Limestone; medium brownish-gray, medium hard, very sandy; with some siltstone and fine-grained sandstone.
4120-4140	Siltstone, gray-green, hard, calcareous with some gray-green calcareous shale.
4140-4155	Shale; greenish-gray, calcareous, fairly firm, splintery.
4155-4165	Sandstone; light gray, very fine-grained, medium hard, slightly calcareous, some calcareous brown shale.
4165-4245	Shale; brown and greenish-gray, firm and splintery, with numerous thin beds dense brown crystalline limestone.
4245	Top Piper Shale.
4245-4280	Shale; brick red, fairly soft, slightly anhydritic, some calcareous brown shale.
4280-4335	Shale; light greenish-gray, slightly calcareous; some light gray to brown microcrystalline limestone, trace of white anhydrite.
4335	Top Piper Limestone.
4335-4380	Limestone; brown, dense, amorphous, some fracturing.
4380	Top Gyp Springs.
4380-4400	Shale; gray-green, medium soft, calcareous with some interbedded white calcite.

4400-4415 Limestone; medium brown, medium soft, micro-crystalline, slightly sandy; some light gray, soft siltstone.

4415-4440 Shale; grey, green, medium soft, with inter-bedded white calcite.

4440-4465 Limestone; medium brown; dolomitic, medium hard, microcrystalline, few scattered clear quartz grains.

4465-4495 Siltstone; light gray, soft, anhydritic, with some dense brown amorphous to microcrystalline limestone.

4495-4535 Limestone; medium to dark brown, very hard, microcrystalline, numerous thin, tight, hairline fractures; some white anhydrite and gray siltstone, as above.

4535-4590 Shale; reddish brown, very soft, anhydritic, some brown, dense limestone.

4590 Top Spearfish.

4590-4610 Shale; reddish brown, slightly silty; with some red calcareous, very fine-grained sandstone, trace of white anhydrite.

4610-4695 Sandstone; brownish-red, very fine-grained, very calcareous; some soft red Shale and soft white anhydrite; trace of crystalline gray dolomite.

4695 Top Amsden.

4695-4740 Limestone; pink, microcrystalline, very dolomitic; trace of red, fine-grained calcareous sandstone.

4740-4840 Limestone; light gray to light brown, very hard, microcrystalline, very fossiliferous; with some red Shales and white anhydrite.

4840 Top Heath.

4840-4880 Shale; dark red, green and grey; medium firm, slightly anhydritic; trace of tan microcrystalline limestone.

4880-4894 Core No. 8.

4894-4911 Core No. 9; Drill Stem Test No. 3.

4911-4940 Shale; red, green, grey, purple, medium firm, slightly calcareous.

4940-4960 Shale; light grey, medium firm, some fairly large limestone fragments as inclusions in shale.

4960-4980 Sandstone, light grey, very fine-grained, slightly calcareous, porous, slight oil stain.

4980-5000	Shale; red, gray, green, black, soft, slightly calcareous; some soft white anhydrite.
5000	Top Otter.
5000-5020	Limestone; light gray to tan, very dolomitic, medium soft, cryptocrystalline; much red staining giving mottled appearance.
5020-5040	Shale; red, gray, green, yellow, medium soft, slightly sandy.
5040-5060	Limestone; medium gray, medium hard, microcrystalline, slightly dolomitic.
5060-5120	Shale; red, green, gray, medium firm, slightly anhydritic, becoming sandy toward base; some gray, crystalline limestone.
5120	Top Kibby.
5120-5146	Sandstone, rust red, fine-grained, angular, fairly well cemented; some vari-colored shales.
5146-5162	Sandstone; light gray, fine-medium grained, angular, porous; some oil stain and fluorescence, some vari-colored shales.
5162-5175	Shale; red, fairly soft, slightly silty; some vari-colored shales and some fine-grained red sandstone.
5175-5185	Sandstone; red, very fine-grained, well cemented; some red and green shale.
5185-5200	Limestone; light gray, microcrystalline, medium hard and dense.
5200-5275	Sandstone; dark red, fine-medium grained, slightly calcareous well-rounded grains; trace of red Shale.
5275	Top Kibby Limestone.
5275-5300	Limestone; very light gray, microcrystalline, medium hard, numerous inclusions clear calcite, very fossiliferous; trace of red shale and red sandstone.
5300-5330	Sandstone; red, very fine-grained, well cemented, well-rounded grains, very calcareous; some red Shale.
5330-5345	Shale; light greenish-gray, very silty; some red Siltstone.
5345-5400	Sandstone, red, very fine grained, medium hard, tight, sand grains fairly well rounded, slightly calcareous.

5400	Top Charles.
5400-5420	Anhydrite; white soft; some light gray, dense limestone.
5420-5430	Anhydrite; white, with some gray, soft, shaly, limestone and gray, medium hard dolomite.
5430-5464	Limestone; medium gray, fine-medium crystalline, medium hard, very argillaceous, some white anhydrite; some hard, dense, gray dolomite.
5464-5483	Core No. 10.
5483-5512	Core No. 11.
5512-5525	Limestone; medium brownish-gray, microcrystalline, medium hard, numerous inclusions clear calcite crystals, few grains showing oolitic development.
5525-5540	Limestone; medium brown-tan, microcrystalline, fairly soft, some soft, white anhydrite.
5540-5599	Anhydrite; white, medium hard, micro to very fine crystalline, some brownish-gray, dense limestone and gray dolomite.
5599-5634	Core No. 12.
5634-5674	Anhydrite; white, light gray, amorphous-microcrystalline, medium hard; some limestone, brownish-gray, fine crystalline, medium hard; some dolomite, light gray, fine crystalline, very sandy.
5674-5700	Limestone; brownish-gray, microcrystalline to fine crystalline, medium hard, slightly argillaceous; some gray dense dolomite, and some white, light gray anhydrite.
5700-5750	Limestone; brownish-gray, microcrystalline, very hard, with some light gray microcrystalline dolomite; trace of white anhydrite.
5750-5775	Core No. 13.
5775-5786	Core No. 14.

Total Depth: 5786 Driller.

Location: C NE Se Sec. 10-T28N-R51E.
Spacing = 40 acres
Elevation: 2101' KB - 2089 G.L.
Spudded: 7-12-52
Completed: 8-21-52
T.D.: 5785' Drlr = 5788' Schl.
Prod. Zones: B-1 (5612-20') B-2 (5629-39')
C-2 Open hole (5776-88')

Schlumberger Tops

	Depth	Datum	Thickness
Judith River	763	+1338	
Greenhorn	2368	- 267	
Muddy Sd	2914	- 813	
Dakota Silt	3133	-1032	
Piper Ls	4343	-2242	
Amsden	4707	-2606	
Heath	*4837	-2736	
Otter	4990	-2889	
Kibbey Sd	5127	-3026	
Kibbey Ls	5283	-3182	
Madison	5378	-3277	
A-1	**5463	-3362	3'
A-2	**5478	-3377	5'
A-3	**5501	-3400	9'
A-4	*5510	-3409	24'
B-1	5612	-3511	8'
B-2	5629	-3528	14'
B-3	**5650	-3549	8'
B-4	**5684	-3583	5'
B-5	5721	-3620	?
C-1	**5760	-3659	?
C-2	----	----	---

**Probable Prod. Zones (From DST struc-ural position, etc.)
*Shows

Drill Pipe Corrections (Made)
3702 Driller = 3705 SLM (+3')
4114 Driller = 4911 SLM (-3')
5460 Driller = 5464 SLM (+4')
5739 Driller = 5940 SLM (+1')

Coring Intervals:

#1	655-685	Rec. 11'	Judith River	#8	4880-4894 Rec. 12' Heath
#2	685-701	Rec. 6'	Judith River	#9	4894-4911 Rec. 17' Heath
#3	701-728	Rec. 22½'	Judith River	#10	5464-5483 Rec. 17' A-1 & A-2
#4	728-748	Rec. 9½'	Judith River	#11	5483-5512 Rec. 31' A-3 & A-4
#5	748-752	Rec. 4'	Judith River	#12	5599-5634 Rec. 35' B-1 & B-2
#6	752-790	Rec. 32'	Judith River	#13	5750-5775 Rec. 25' C-1
#7	790-820	Rec. 30'	Judith River	#14	5775-5786 Rec. 11' C-1

Drill Stem Tests:

DST #1 769-789 Judith River, packer failed after 14 min. Rec. 390' mud. IBHFP 0, Hydro 500#.

DST #2 793-820 Judith River. Op 30 min. SI 20 min. Rec. 10' mud. IBHFP 0 FBHFP 0, SIP 0, Hydro 550#.

DST #3 4895-4911, Heath. Op 1 hr, SI 15. Rec. 85' mud cut w/blk o & g, 135' s.w. IBHFP 0, FBHFP 50#, SIP 2325#, Hydro 2675#.

DST #4 5489-5512 A-3. Op 4 hrs, SI 20. Rec. 1659' s.w. IBHFP 0 FBHFP 800#, BHSIP 2900#, Hydro 3200#.

DST #5 5604-5634 B-1. Op 1 hr, SI 10 min. Rec. 1135' oil, 135' oil cut mud, 110' blk s.w. IBHFP 300, FBHFP 625 BHSIP 2850 Hydro 3300#.

DST #6 5771-5786 C-2. Op 4 hr, SI 15 min, Rec. 70' oil, 152' hvly o & g cut mud. IBHFP OFBHFP 50 BHSIP 3100 Hydro 3400.

History Subsequent to Completion:

11-25-56: Blanked off C zone with Otis Separation Tool.

28

IMC DRILLING MUD

A DIVISION OF INTERNATIONAL MINERALS & CHEMICAL CORPORATION

WELL DATA SUMMARY

COMPANY: Murphy Corp.	CONTRACTOR: "Workover Unit"
ADDRESS: Murphy Bldg., El Dorado, Ark.	ADDRESS:
REPORT FOR MR.: James	REPORT FOR MR.:
WELL NAME & NO.: E. P. Unit # 6	FIELD:
STATE: Montana / COUNTY: Roosevelt	DESCRIPTION OF LOCATION:
IMC WAREHOUSE: XWolf Point	

WELL DATA

DATE SPUDDED: Approx. 5-12	CSG. SIZE	O.D.	FROM — TO		HOLE SIZE	FROM —	TO
TOTAL DEPTH: (W.O.)	CSG. SIZE	O.D.	FROM — TO		HOLE SIZE	FROM —	TO
DATE TD REACHED: Approx 6-23	CSG. SIZE	O.D.	FROM — TO		HOLE SIZE	FROM —	TO
TOTAL DAYS	CSG. SIZE	O.D.	FROM — TO		HOLE SIZE	FROM —	TO

BITS: NUMBER AND SIZE

MUD UP DEPTHS

TYPE MUD

COMMENTS

Work-Over Well

FORM 2-509
PRT'D. IN U. S. A.

Ray Danni
SERVICE ENGINEER [redacted]

FORM 2-513 REV. 11-63
PRTD IN U.S.A.

IMC DRILLING MU

INTERNATIONAL MINERALS & CHEMICAL CORPORAT
3801 KIRBY DRIVE - HOUSTON, TEXAS 770

COST SUMMARY

MURPHY CORP.

E. P. UNIT A-5

25 OLF POINT

TOTAL DEPTH

P.O. NUMBER

DATE
07-03-68

PRODUCT	UNITS	SIZE	AMOUNT
IMCO BAR	240	100LB	36400
IMCO BAINEGEL	60	100LB	20260
IMCO DEFOAM	1	75LB	3000
SALT	100	100LB	17500
SODA ASH	2	100LB	1800
			78980*
DRAYAGE			8577
			8577*
			87557*

EPA #6
S+T
11 pages
52 to 62

WORKOVER HISTORY NO. 1

December 11, 1963

Well Lease and Number: East Poplar Unit Well No. 6

Field: East Poplar Unit County: Roosevelt State: Montana

Well Location: NE SE Section 10, T28N, R51E

STATUS PRIOR TO PRESENT JOB:

Date Completed: August 22, 1952 Date of last workover: None

T.D. : 5788' PBTD: None Producing Zone: C-3 Zone of Madison Formation

Perforations: 5776-88' Cumulative Production of Present Zone: 226,859 BO, 520,538 BW

Latest Test: December 4, 1963 - Pumping 285 BFPD, 92% water, (23 BOPD, 262 BWPD)

JUSTIFICATION FOR WORKOVER: Dual Produce the B-1 & 2 and C Zones.
Pump the B-1 & 2 Zones and flow the C-Zone

SUMMARY OF WORKOVER:

12-11-63 TD 5788' - Moved in and rigged up pulling unit.

12-12-63 TD 5788' - Rigged up Dia-Log and attempted to run Dia-Log Calliper survey in 2-7/8" tubing. Failed to get tool down tubing due to well pressure. Shut down due to high wind and cold weather.

12-13-63 TD 5788' - Started rigging up mud mixing pump and tank. Found suction and tank froze up. Shut down for crew to thaw out same.

12-14-63 TD 5788' - Rigged up and mixed lost circ. material in mud. Attempted to pull Otis Separation tool with sand line. Unable to get tool down. Rigged up Halliburton and killed well. Pumped 25 bbls. of mud down tubing into C-Zone, well on vacuum. Pumped 65 bbls. down casing into B-Zones with 1500# at rate of .5 BPM. Pressure increased. Shut well in overnight.

12-15-63 TD 5788' - Well dead at 7:00 AM. Put on B.O.P. worked and rotated tubing 2 hrs. to break Baker latch on sub in Model "D" Production Packer. Layed down one joint of tubing. Well started flowing. Closed well in, rigged up Halliburton and pumped 50 bbls. of mud down casing, well on vacuum. Pulled tbg. out of hole. Ran Baker flow tube on Lane Well W.L. Set in Model "D" Packer at 5758'. Ran J.B. and G.R. on W.L. to 5754'. Collar locator failed to work. Ran Baker Model B.C. retainer on W.L. Power charge failed to fire. Shut well in and released Lane Wells Truck.
(NOTE: Fishing neck on flow tube in Model "D" Packer 45" long with 3-1/16 collar on top).

[redacted]

SUMMARY OF WORKOVER CONTINUED:

12-16-63 TD 5788' - Ran J.B. and G.R. with Wireline to Tag. at 5734', Ran Baker Model B.C. Retainer on W.L. set top of retainer at 5748'. Changed out 2581' of 2-3/8" tubing to 2-7/8" tubing Class #1. Ran Model B.C. Stinger and Seal Assembly with Baker Model "R" Packer in hole to 2730'. Shut well in overnight.

12-17-63 TD 5788' - Finished running 2-7/8" tbg. in hole. Displaced mud with salt water at 5748'. Set Baker Model "R" Packer at 5650'. Tested Baker Model B.C. Retainer and casing from 5650' to 5748' with 1500#, held ok. Reset packer at 5600' tested casing and well head equipment to 1000#, held ok. Released packer spaced out tubing and stung into B.C. retainer at 5748'. C-Zone started flowing. Put well on P-36 choke and switch to tank battery.

12-18-63 TD 5788' - Flowing. Choke plugging.

12-19-63 TD 5788' - Flowing. Clean up C-2 Zone of lost circulating material.

12-20-63 TD 5788' - Rigged up pulling unit, pulled stinger out of Baker Model B.C. Retainer at 5748'. Layed down 5 jts. of tbg. Set Baker Model "R" Packer at 5594' to swab test B-1 & 2 perf. at 5612 to 20', 5629 to 39'. Swabbed to pit 3 hrs. Fluid level at 3700'. Water cut 75%, Chloride 104,000 PPM. Released packer and started out of hole with tbg. Closed well in overnite.

12-21-63 TD 5788' - Finished pulling out of hole. Layed down Model "R" Packer. Ran Baker Model 45A2 Retreivable Isolation Packer with B.C. stinger. Space packer at 5565'. Stung into B.C. Retainer at 5748'. Set tubing anchor and unloader sub would not hold. Released anchor, pulled out of hole. Sent tool to Bakers shop for repair. Closed well in overnight.

12-22-63 TD 5788' - Ran Baker Model 45A2 Retreivable Isolation Packer in hole with unloader sub closed. Stung into B.C. Retainer at 5748' with isolation packer spaced at 5560'. Set tbg. anchor and slips fail to hold. Released unloader sub to rotate anchor free to sting into B.C. Retainer. Unable to close unloader sub. Pulled out of hole, sent tool to shop to take out unloader sub. Closed well in.

12-23-64 TD 5788' - Ran Baker Model 45A2 Retreivable Isolation Packer without unloader sub. Stung into B.C. Retainer at 5748'. with isolation packer spaced at 5560'. Open tbg. to pit. Well flowed strong stream indicating isolation packer not holding. Pulled same out of hole. Ran tbg. with seating nipple spaced at 4500'. Shut in overnite.

12-24-63 TD 5788' - Ran 2-1/2" x 2" x 16' insert pump and rods. Started well pumping at 12:30 PM 12-24-63.

12-25-63 TD 5788' - Pumping the B-1 & 2 Zones only, to test when leveled off.

SUMMARY OF WORKOVER CONTINUED:

12-26-63 TD 5788' - Pumping the B-1 & 2 Zones, no test.

12-27-63 TD 5788' - Pumping the B-1 & 2 Zones, 18 hour test pumping at the rate of 332 BFPD, 94% water, 20 BOPD, 312 BWPD, Chlorides 84,000 PPM.

12-28-63 TD 5788' - Pumping at the rate of 331 BFPD, 94% water, 20 BOPD, 311 BWPD, chlorides 83,000 PPM.

12-29-63 TD 5788' - Pumping, no test.

12-30-63 TD 5788' - Pumping the B-1 & 2 Zones. Pumping at the rate of 330 BFPD, 93% water, (chlorides 84,000 PPM), 23 BOPD, 307 BWPD.

12-31-63 TD 5788' - Pumping at the rate of 330 BFPD, 92% water, 26 BOPD, 304 BWPD, chlorides 82,000 PPM.

1-01-64 TD 5788' - Pumping at the rate of 329 BFPD, 93% water, 23 BOPD, 306 BWPD.

1-02-64 TD 5788' - Pumping at the rate of 322 BFPD, 92% water, 26 BOPD, 296 BWPD, chlorides 82,000 PPM.

1-03-64 TD 5788' - Pumping at the rate of 316 BFPD, 93% water, 22 BOPD, 294 BWPD from the B-1 & 2 Zones. TO TEMPORARILY DROP FROM THE REPORT UNTIL DUAL EQUIPMENT IS AVAILABLE.

2-03-64 TD 5788' - Rigged up pulling unit. Pulled rods and tubing out of hole. Closed well in overnight.

2-04-64 TD 5788' - Ran Baker Isolation Packer and Baker B.C. stinger. Stung into B.C. Packer at 5748' with isolation packer and cross-over flow tube spaced 5586'. B-1 perf. 5612'-20', B-2 perf. 5629'-39'. Ran pump and rods. Started well pumping at 2:00 PM 1-04-64. (All dual equipment holding, to start flowing the C-Zone today).

2-05-64 TD 5788' - Pumping the B-1 & 2 Zones. Flowing the C-3 Zone. To test the C-3 Zone today.

2-06-64 TD 5788' - Pumping the B-1 & 2 Zones, flowing the C-3 Zone. Workover potential 2-2-64 - B-1 & 2 Zones pumping commingled 334 BFPD, 91% water, 30 BOPD, 304 BWPD.

Workover potential 2-6-64, C-3 Zone flowing on P-35 choke, TFP 525#. Flowing at the rate of 309 BFPD, 90% water, 31 BOPD, 288 BWPD.

TO DROP FROM REPORT.

WELL WORKOVER:

1. Final Perforations: 5612-20' - 5629-32' - 5716-86'

2. Final PBTD: None

3. Test After Workover: B-1 & 2 - 334 BFPD, 91% water, 30 BOPD, 304 BWPD
C-3 - 309 BFPD, 90% water, 31 BOPD, 288 BWPD

4. Geologic Name of Producing Zone: B-1 & 2 & C-3 Zone of the Madison Formation

TUBING RECORD:

KKB	8.00
1 Jt.	30.49
2 Subs	14.05
148 Jts. 6.50# tbg.	4500.65
1 Seating Nipple	1.10 / 10.71
33 Jts.	1030.59
Isolation packer & Cross-over sub	10.71
5 Jts. 6.50# tbg.	150.47
Stinger	3.65
Top of B.C. Retainer = 5748'	5749.71

ROD RECORD:

72	7/8"	1800'
109	3/4"	2725
		4525

REMARKS:

2-1/2" x 2" x 16' insert pump T.H.P.

IMC DRILLING MUD

A DIVISION OF INTERNATIONAL MINERALS & CHEMICAL CORPORATION

WELL DATA SUMMARY

COMPANY: Murphy Corp.	CONTRACTOR: "Workover Unit"
ADDRESS: Murphy Bldg., El Dorado, Ark.	ADDRESS:
REPORT FOR MR.: James	REPORT FOR MR.:
WELL NAME & NO.: E. P. Unit # 6	FIELD:
STATE: Montana / COUNTY: Roosevelt	DESCRIPTION OF LOCATION:
IMC WAREHOUSE: XWolf Point	

WELL DATA

DATE SPUDDED: Approx. 5-12	CSG. SIZE O.D.	FROM	TO	HOLE SIZE	FROM	TO
TOTAL DEPTH: (W.O.)	CSG. SIZE O.D.	FROM	TO	HOLE SIZE	FROM	TO
DATE TD REACHED: Approx 6-23	CSG. SIZE O.D.	FROM	TO	HOLE SIZE	FROM	TO
TOTAL DAYS	CSG. SIZE O.D.	FROM	TO	HOLE SIZE	FROM	TO

BITS: NUMBER AND SIZE

MUD UP DEPTHS

TYPE MUD

COMMENTS

Work-Over Well

FORM 2-509
PRT'D. IN U. S. A.

Ray Danni
SERVICE ENGINEER

MURPHY 02397

FORM 2-517 REV. 11-63
PRT'D IN U.S.A.

IMC DRILLING MU

INTERNATIONAL MINERALS & CHEMICAL CORPORAT
3801 KIRBY DRIVE - HOUSTON, TEXAS 770

COST SUMMARY

MURPHY CORP.

E. P. UNIT - 8

EX GOLF POINT

TOTAL DEPTH

P.O. NUMBER

DATE
07-03-64

PRODUCT	UNITS	SIZE	AMOUNT
IMCO BAR	140	100LB	36400
IMCO BRINEGEL	60	100LB	20250
IMCO DEFOAM	1	75LB	3000
SALT	100	100LB	17500
SODA ASH	2	100LB	1800
			78950*
DRAYAGE			8577
			8577*
			87527*

CORE ANALYSIS REPORT

FOR

MURPHY CORPORATION

EAST POPLAR UNIT NO. 6 WELL

EAST POPLAR FIELD

ROOSEVELT COUNTY, MONTANA

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

October 3, 1952

Murphy Corporation
1125 University Building
Denver, Colorado

Attention: Mr. Gordon Kirby

Subject: Core Analysis
East Poplar Unit No. 6 Well
East Poplar Field
Roosevelt County, Montana

Gentlemen:

Diamond conventional cores from the subject well in the Judith River, Heath, Charles and Madison formations have been sampled and quick-frozen by a representative of Core Laboratories, Inc. and later analyzed in our Williston, North Dakota laboratory. Results of the analysis are presented in tabular and graphical form on the attached Coregraph and Special Analysis Core Report. Water base mud was used as the drilling fluid.

Permeability and porosity measurements were made on core from the Judith River formation from 765 to 784 feet. Formation analyzed from 790 to 820 feet is interpreted to be water productive.

Heath formation analyzed from 4894 to 4911 feet is interpreted to be low capacity, water productive.

Charles formation analyzed by conventional methods from 5490 to 5512 feet is interpreted to be essentially nonproductive. Charles and Madison formations analyzed by conventional methods from 5750 to 5775 feet also are interpreted to be essentially nonproductive due to low permeability and porosity.

Charles formation analyzed by special analysis methods from 5606 to 5614.5 and from 5623 to 5634 feet is interpreted to be essentially oil productive.

Madison formation analyzed by special analysis methods from 5775 to 5786 feet is interpreted to be essentially oil productive where permeable.

Recovery estimates for the zones, 5606 to 5614.5, 5623 to 5634 and 5775 to 5786 feet, are given on page one. Samples with an asterisk in the permeability column of the Special Analysis Core Report are samples that were broken or crushed and were therefore unsuitable for special permeability analysis. The broken and crushed samples represent the most permeable formation, however, so the samples denoted by an asterisk in the probable production column are assumed to be productive and are included in the recovery estimates. Please note that this is a departure from our previous procedure.

We hope these data prove beneficial in the evaluation of this well.

Very truly yours,

Core Laboratories, Inc.

J D Harris (PE)

J. D. Harris,
District Engineer

JDH:ma

FORM F-11A

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS

File FL 25-293
Well East Poplar Unit No. 6

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

CORE SUMMARY

FORMATION NAME	Charles	Charles	Madison
DEPTH, FEET	5606.0-5614.5	5623.0-5634.0	5775.0-5786.0
% CORE RECOVERY	100	100	100
FEET OF PERMEABLE, PRODUCTIVE FORMATION RECOVERED	8.5	11.0	11.0
AVERAGE PERMEABILITY MILLIDARCYS	Max.: 0.2 90°: 0.04	Max.: 0.8 90°: 0.02	Max.: 0.1 90°: 0.05
CAPACITY — AVERAGE PERMEABILITY X FEET PRODUCTIVE FORMATION	Max.: 1.7 90°: 0.34	Max.: 8.8 90°: 0.22	Max.: 1.1 90°: 0.55
AVERAGE POROSITY, PERCENT	11.7	11.0	9.8
AVERAGE RESIDUAL OIL SATURATION, % PORE SPACE	15.2	15.6	30.7
GRAVITY OF OIL, °A.P.I.	39	39	39
AVERAGE TOTAL WATER SATURATION, % PORE SPACE	39.9	39.6	39.7
AVERAGE CALCULATED CONNATE WATER SATURATION, % PORE SPACE	39.9	39.6	39.7
SOLUTION GAS-OIL RATIO, CUBIC FEET PER BARREL (1)	490	490	520
FORMATION VOLUME FACTOR—VOLUME THAT ONE BARREL OF STOCK TANK OIL OCCUPIES IN RESERVOIR (1)	1.29	1.29	1.31

CALCULATED RECOVERABLE OIL

{ Prediction dependent upon complete isolation of each division. Structural position of well, total permeable thickne of oil zone and drainage area of well should be considered.

BY NATURAL OR GAS EXPANSION, BBLS. PER ACRE FOOT (2)	100	94	81
INCREASE DUE TO WATER DRIVE, BBLS. PER ACRE FOOT	185	172	35
TOTAL AFTER COMPLETE WATER DRIVE, BBLS. PER ACRE FOOT (3)	285	266	116

Core Laboratories, Inc.

J D Harris (PE)
J. D. Harris

NOTE:

(*) REFER TO ATTACHED LETTER.

(1) REDUCTION IN PRESSURE FROM estimated SATURATION PRESSURE TO ATMOSPHERIC PRESSURE.

(2) AFTER REDUCTION FROM ORIGINAL RESERVOIR PRESSURE TO ZERO POUNDS PER SQUARE INCH.

(3) RESERVOIR PRESSURE MAINTAINED BY WATER DRIVE AT OR ABOVE estimated ORIGINAL SATURATION PRESSURE.

(4) NO ESTIMATE FOR GAS PHASE RESERVOIRS.

13 3/8	4	40	Hand		
9-5/8	36	400	Pump & Plug		
5½	15.50	250	Pump & Plug		

FOLD | MARK

PLUGS AND ADAPTERS

Heaving plug—Material ..... Length ..... Depth set .....

Adapters—Material ..... Size .....

SHOOTING RECORD

Size	Shell used	Explosive used	Quantity	Date	Depth shot	Depth cleaned out
1¼	Jet		32	8-21-52	5612-5620	
1½	Jet		10	8-21	5629-5639	

TOOLS USED

Rotary tools were used from 0 feet to 5786 feet, and from ..... feet to ..... feet

Cable tools were used from ..... feet to ..... feet, and from ..... feet to ..... feet

DATES

8-22, 19 52 Put to producing 8-21, 19 52

The production for the first 24 hours was 271 barrels of fluid of which 99 % was oil; 1 % emulsion; ..... % water; and ..... % sediment.

Gravity, °Bé. 40.6

If gas well, cu. ft. per 24 hours ..... Gallons gasoline per 1,000 cu. ft. of gas .....

Rock pressure, lbs. per sq. in. .....

EMPLOYEES

T. W. Gray, Driller L. M. Massey, Driller

C. B. Morris, Driller ....., Driller

FORMATION RECORD

FROM—	TO—	TOTAL FEET	FORMATION
1159			Eagle
2024			Niobrara
2368			Greenhorn
2570			Graneros
2717			Upper Muddy
2914			Muddy
3133			Dakota
3503			Morrison
3913			Ellis
4090			Rierdon
4268			Piper Shale
4343			Piper Lime
4707			Amsden
4837			Heath
4990			Otter
5121			Kibbey
5378			Madison
5489			"A" Zone
5612			"B-1" Zone
5629			"B-2" Zone
5768			"C" Zone
5786			Total Depth

268 oil
3 water

(OVER)

16—43094-2

Production &
Injection

SURFACE EQUIPMENT

PLUGGING &
ABANDONMENT